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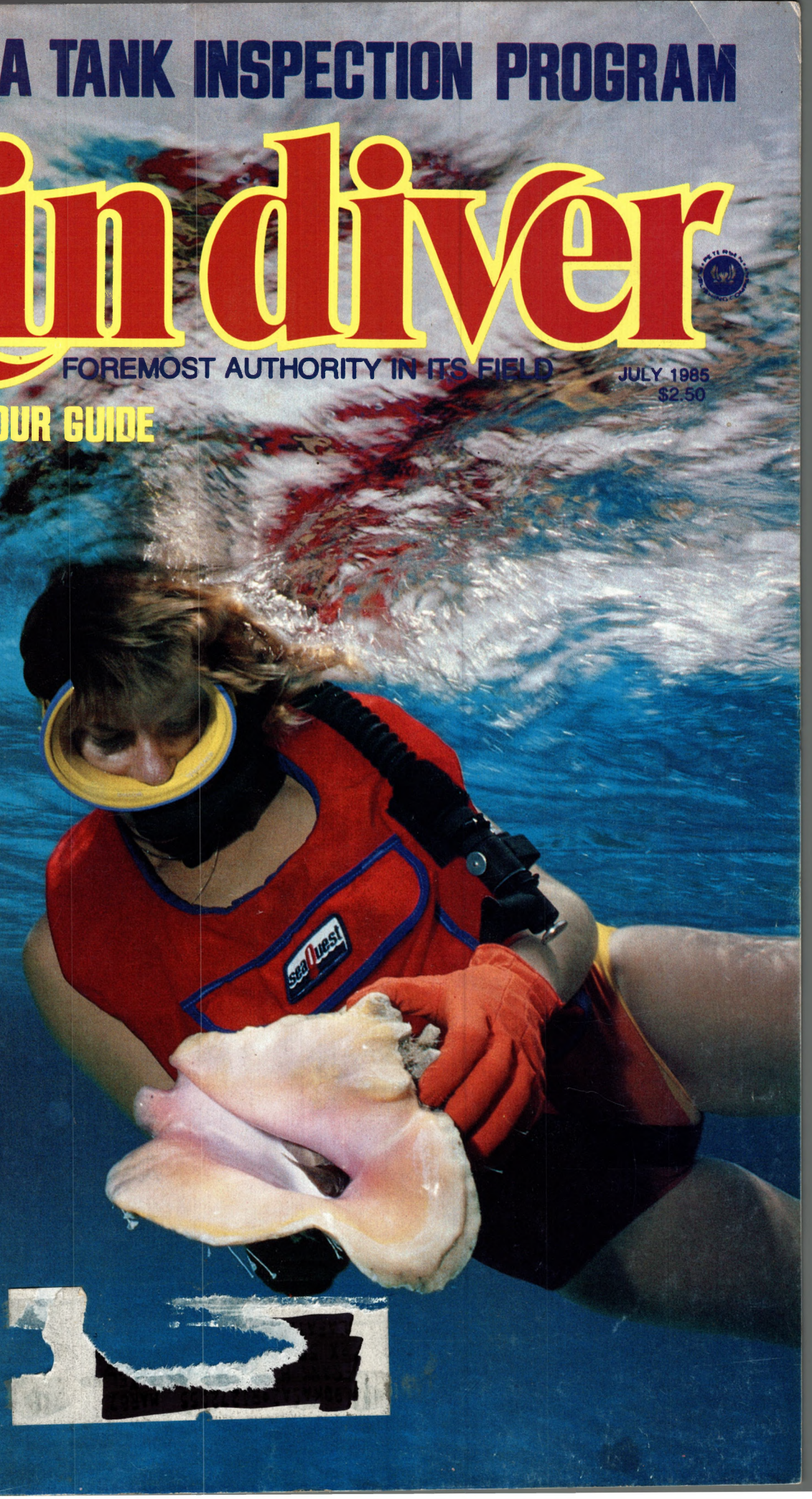
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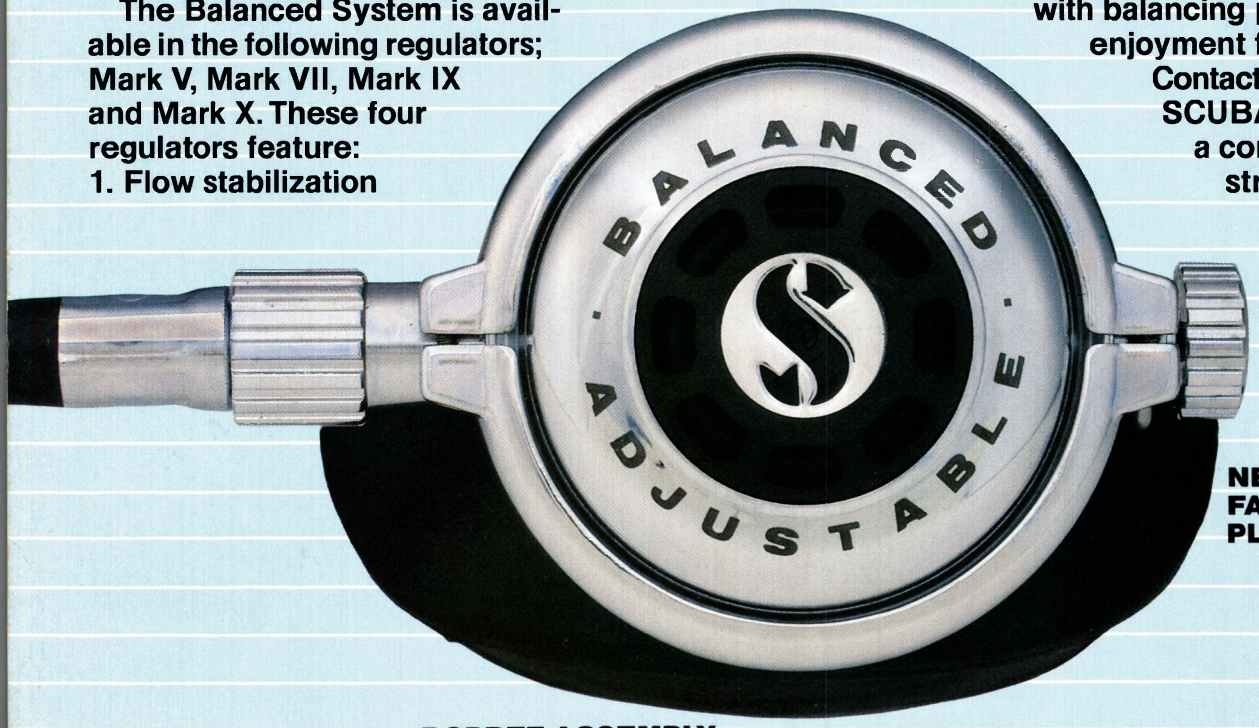
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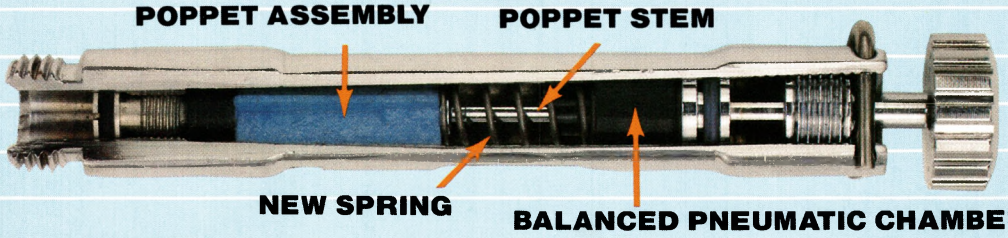
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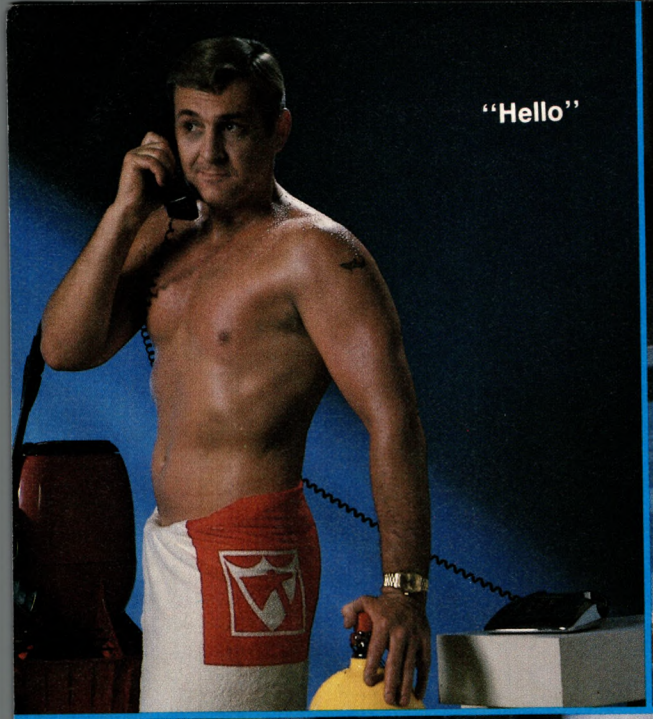
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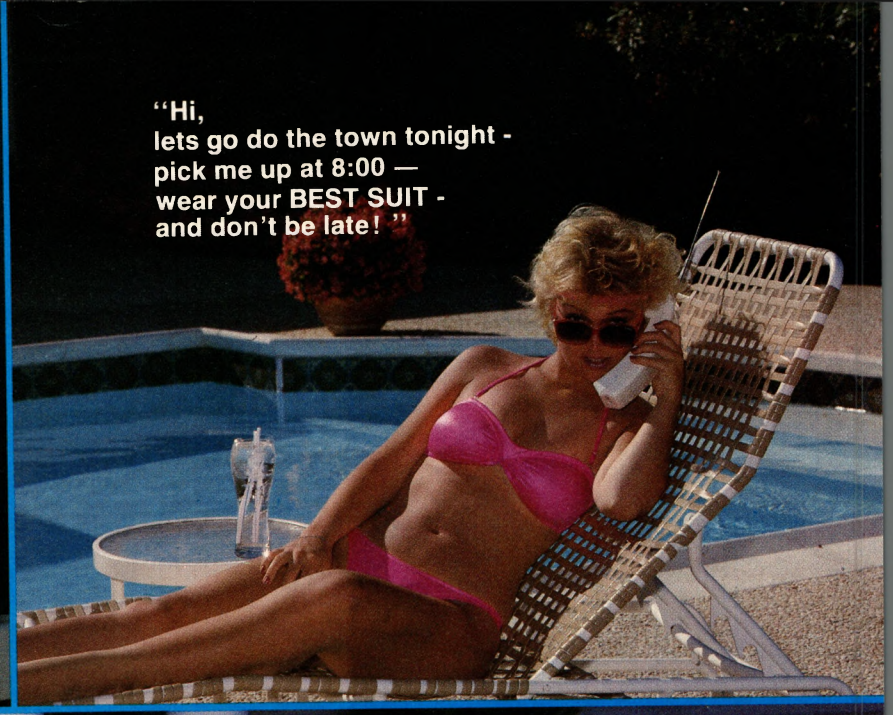
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Volume Thirty-four *Number Seven*

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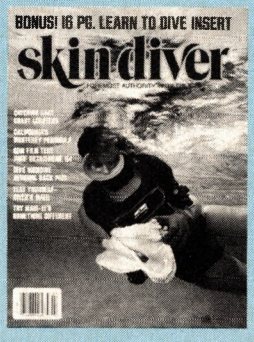
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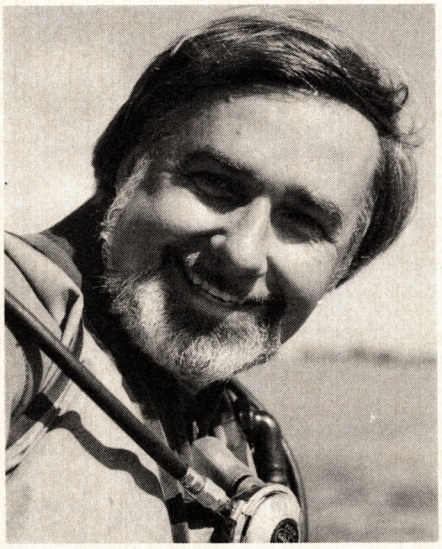


COVER
Snorkeler Shari Kurgis examines a queen conch retrieved from the Caribbean seafloor. Photo/Geri Murphy.

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SDM Editorial

BY THE PUBLISHER



THE MAKING OF A QUALIFIED DIVER

How long? How long does it take to become a qualified diver? This is the question asked by every neophyte who has just enrolled in a scuba class. The question is disarmingly simple, but the answer is complex.

The answer to "how long" can range from two weeks to two years. A lot depends on such factors as environment, geographic location, water conditions and dive skills involved. For example, California kelp diving is more strenuous than a leisurely cruise through the shallow coral reefs of Pennekamp Park. Diving in the frigid 39°F water of Puget Sound requires more training than diving in the 80°F waters of Grand Cayman. Wreck diving in the cold, murky depths of the Great Lakes requires far more skill and experience than exploring a shipwreck off Ft. Lauderdale. And, diving the shipwrecks off the New York-New Jersey coast may be the toughest of all.

One thing can be said for sure. A person graduating from a basic open water scuba course is not a fully qualified, self-sufficient diver. Basic certification is not the end—it is the beginning.

A person who completes basic open water training has learned the theory of diving through classroom lectures and discussions. He/she has been taught the safe handling of scuba gear in pool practice and has been introduced to open water diving. This kind of course was never intended to make a person fully qualified. It is a launching point on a course toward higher learning and greater experience.

Some experts say it takes 50 hours of open water experience to become a fully confident, qualified diver. Some say it takes 100 hours. Only the individual can tell when he or she has achieved the level of a qualified diver: There is a special feeling of confidence that develops.

Because of the limitations of the basic open water course, the major scuba training associations of the U.S. have developed a two part educational system—the basic open water course and the advanced diver training course. Each association has its own names for these programs, but they are primarily the same concept.

Why not just one giant, comprehensive course that encompasses both basic and advanced training? Because it is impractical and runs against the grain of consumer acceptance. It has been tried and rarely works, except for a few isolated college and university programs.

Most people interested in learning scuba want to "try it before they buy it." They are seeking a brief, inexpensive introduction prior to making a major investment. The basic open water scuba course fulfills this desire and starts them on the right road to diver safety.

Advanced diver training is where it's at. This is where people really begin to learn and refine their diving skills. This is where people begin to acquire an appreciation and an enjoyment for the U/W world.

The trend toward advanced diver training is clear cut. SKIN DIVER Magazine conducts a national survey of its readers every two years and we have found the popularity of advanced diver training is mushrooming. In each survey the magazine has asked how many of its readers have received advanced diver training. The results speak for themselves:

Advanced Diver Certification

1985	43.8 percent
1983	37.5 percent
1981	21.2 percent

Advanced diver training and certification among SKIN DIVER Magazine readers has more than *doubled in five years*! During the next five years we believe almost every new diver will enroll in some type of advanced diver or specialty diver training course.

Why the dramatic shift toward this type of training? Two reasons: First, the diver training associations all agree that advanced training is the *key* to safety. It is the most effective way to reduce diving accidents. Second, there has been a fairly recent explosion of advanced diver training programs, books, manuals, trips and so on.

Today's new diver is blessed with a wide, wide selection of advanced and specialty training options. These programs have been made available at local dive stores, at tropical resorts, aboard local boats and aboard long range liveaboard boats.

A new diver can enroll in a straight advanced training course or select a specialized program in night diving, wreck diving, marine identification, cave diving, deep diving, etc. There is no end to the programs being made available.

Another significant trend in advanced diver training is that such courses have now become fun. In fact, advanced diver training is a lot more fun than basic diver training. The emphasis is on skill and knowledge rather than survival.

Getting back to the original question of how long it takes to become a qualified diver, the answer is, "a lot longer than the duration of a basic open water course."

The quickest and easiest way to achieve the level of a qualified diver is to enroll in an advanced training program. You can get much more enjoyment out of diving by acquiring the knowledge and skills for true appreciation of this wonderful sport.

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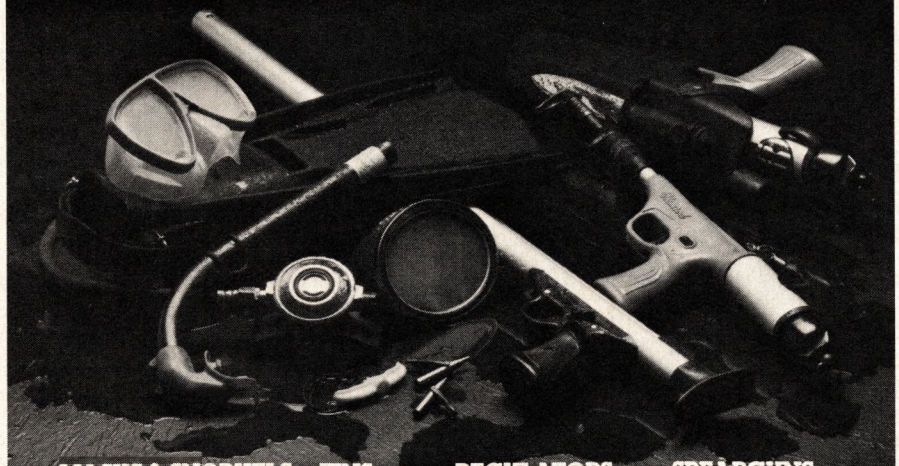
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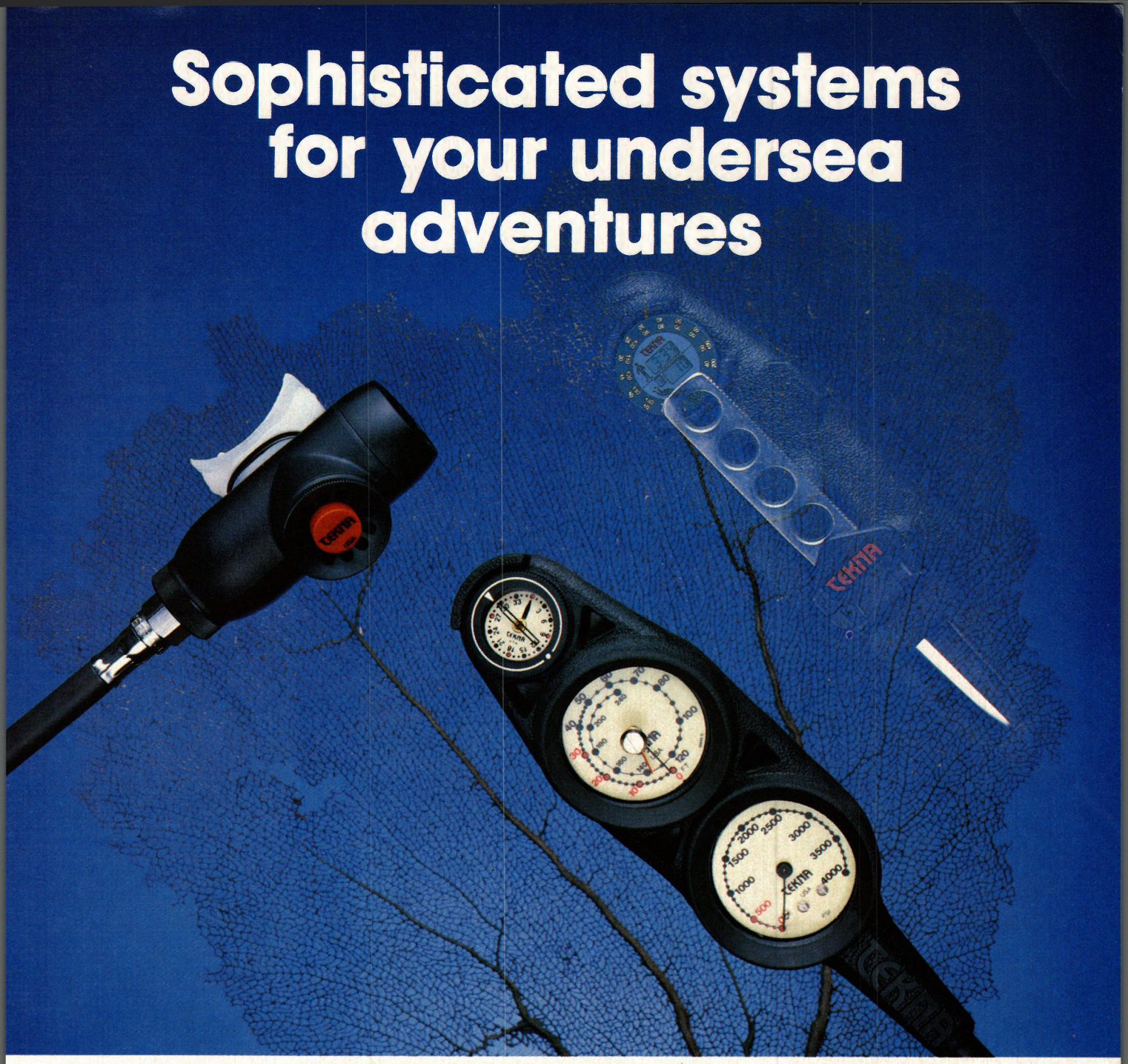
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Scuba Quiz

Topic: Diver's Math

By Dennis Graver

There are a few times when we need to make calculations as divers and there are others when it is good to be able to make them just to show we understand the theory behind the forces affecting us while we dive. Here are some problems for you to solve. Some are practical and some are given just to test your understanding. The answers are on the following page.

1. If a diver uses 1,500 psi of air in 10 minutes at a depth of 68 feet in fresh water, what is the diver's surface air consumption rate? _____ psi per minute

2. If a diver's surface air consumption rate is 60 psi/minute for a given level of activity, approximately how long will 2,500 psi of air last for the same activity level at a depth of 75 feet in salt water? _____ minutes

3. If a one-half cubic foot block of wood weighs 16 pounds, what percentage of the block will remain above water if the block is placed in the ocean? _____ percent

4. If a diver and her equipment weigh 175 pounds for neutral buoyancy in salt water, how much weight will the diver need to add or remove to be neutrally buoyant for freshwater diving when using the same equipment? (- or +) _____ pounds

5. If a tank contains 80 cubic feet of air at a pressure of 3,000 psi and a temperature of 70°F, how much air will the tank contain at the same temperature and a pressure of 650 psi? _____ cubic feet

6. If a scuba tank contains 80 cubic feet of air at 3,000 psi and a temperature of 70°F, what is the pressure in the tank when its temperature is increased to 125°F? _____ psia

7. If a liftbag with a weight of two pounds contains 0.6 cubic feet of air at a depth of 60 feet in the ocean, how much buoyancy would the bag provide upon reaching the surface if no air escaped from it? _____ pounds

8. If a diver's tank contains one percent carbon monoxide, the partial pressure of this gas at a depth of 77 feet in the ocean is _____ psia.

9. The length of the tube in a capillary depth gauge is six inches. What will be the length of the air column in the tube at a depth of 90 feet? _____ inches

10. A diver is at a depth of 70 feet in 40°F fresh water and his/her buoyancy compensator contains two quarts of air. The diver ascends to 30 feet and passes through a 75°F thermocline. If air is neither added nor vented from the BC, what is its new volume after the air inside stabilizes at the new temperature and depth? _____ quarts

Scuba Quiz

Answers: Diver's Math

1. Formulas used: SCR = DCR X (33/Depth + 33); DCR = Air Used / Time

Legend: SCR = Surface Consumption Rate; DCR = Depth Consumption Rate; 33 = One Atmosphere of Pressure (34 feet for fresh water); Air Used = psi; Time = minutes

A. First we find the DCR, which is: 1500/10 = 150 psi/min.

B. Then we calculate the SCR: 150 X (34/68 + 34) = **50 psi/min.**

2. Formulas and Legend: See answer 1

A. First we determine the DCR for the new depth: DCR = 60/[33/(33 + 75)] = 196 psi/min.

B. Next, we determine Time for the new Depth, then substitute values and solve: Time = Air Used/DCR Time = 2500/196 = **12.75 mins.** Note: When solving air consumption problems, always use SCR as the reference consumption rate.

3. Formula: Displacement = Volume X Density

Substituting, we find: Displacement = 0.5 X 64 = 32 lbs. This is the displacement from complete immersion, but the block will float when its weight, which is 16 lbs., is displaced. So, the block has 16 pounds of excess weight which means that 16/32 or **50 percent** of it will float above water.

4. Formula: FWWD = [(TSWW/64) X 62.4] - TSWW

Legend: FWWD = Fresh Water Weight Difference; TSWW = Total Salt Water Weight (175 lbs.); 64 = Density of Salt Water; 62.4 = Density of Fresh Water

Substituting, we find: FWWD = [(175/64) X 62.4] - 175 = 170.6 - 175 = **-4.4 lbs.**

5. Formula: P1/V1 = P2/V2

Legend: P1 = Initial Pressure (Absolute = Gauge + 14.7); P2 = Final Pressure (Absolute = Gauge + 14.7); V1 = Initial Volume (80 cu. ft.); V2 = Final Volume (unknown)

Rearranging and substituting, we find: V2 = V1 X P2/P1 = 80 X 664.7/3014.7 = **17.6 cu. ft.**

6. Formula: P1/T1 = P2/T2

Legend: P1 = Initial Pressure (Absolute = Gauge + 14.7); P2 = Final Pressure (unknown); T1 = Initial Temperature (Absolute = F + 460); T2 = Final Temperature (Absolute = F + 460)

A. First we determine the Initial and Final Temperatures: T1 = 70 + 460 = 530; T2 = 125 + 460 = 585

B. Rearranging and substituting, we find: P2 = T2 X P1/T1 = 585 X 3014.7/530 = **3327.5 psia.**

7. Formulas: Buoyancy = (Density X Volume) - Weight; P1V1 = P2V2; Pressure = (Pressure per foot X Depth) + 14.7

Legend: P1 = Initial Pressure (Absolute = Gauge + 14.7); P2 = Final Pressure (Absolute = Gauge + 14.7); V1 = Initial Volume (unknown); V2 = Final Volume (0.6 cu. ft.)

A. First we detemine the Initial and Final Pressures: P1 = 0 + 14.7 = 14.7 psia; P2 = (60 X .445) + 14.7 = 41.4 psia

B. Next we solve for the Initial Volume by rearranging the formula and substituting values: V1 = P2 X V2/P1 = 41.4 X 0.6/14.7 = 1.69 cu. ft.

C. Next, we substitute the volume value into the buoyancy equation: Buoyancy = (64 X 1.69) - 2 = **106 lbs.**

8. Formulas: Partial Pressure = Percent of Gas X Total Pressure (Absolute); Total Pressure = (Pressure per foot X depth) + 14.7

Total Pressure = (.445 X 77) + 14.7 = 48.97 psia

Partial Pressure = 0.01 X 48.97 = **0.49 psia.**

9. Formulas: P1L1 = P2L2; Pressure = (Pressure per foot X Depth) + 14.7

Legend: P1 = Initial Pressure (Absolute = Gauge + 14.7); P2 = Final Pressure (Absolute = Gauge + 14.7); L1 = Initial Column Length (6 inches); L2 = Final Column Length (unknown)

Note: Since the cross section of the tube is constant, the Length of the air column is directly proportional to the inner Volume; so the Length of the column can be substituted for Volume in Boyle's Law equation.

A. First we find the Initial and Final Pressures: P1 = 0 + 14.7 = 14.7 psia; P2 = (.445 X 90) + 14.7 = 54.75 psia

B. Next, by rearranging and substituting, we find: L2 = P1 X L1/P2 = 14.7 X 6/54.75 = **1.6 inches.**

10. Formulas: P1T1/V1 = P2T2/V2; Pressure = (Pressure per foot X depth) + 14.7

Legend: P1 = Initial Pressure (Absolute = Gauge + 14.7); P2 = Final Pressure (Absolute = Gauge + 14.7); T1 = Initial Temperature (Absolute) (F + 460); T2 = Final Pressure (Absolute) (F + 460); V1 = Initial Volume (2 quarts); V2 = Final Volume (unknown)

A. First we determine the Initial and Final Pressures: P1 = (70 X .432) + 14.7 = 44.94 psia; P2 = (30 X .432) + 14.7 = 27.66 psia

B. Next, we determine the Initial and Final Temperatures: T1 = 40 + 460 = 500; T2 = 75 + 460 = 535

C. Rearranging and substituting, we find the Final Volume: V2 = P1 X V1 X T2/T1 X P2 = 44.94 X 2 X 535/500 X 27.66 = **3.48 quarts.**

By now you must feel that diving is really a matter of doing rather than knowing or you must feel good about having the knowledge to back what you do while diving. Whether you feel frustrated or satisfied as a result of this quiz, it is good to review the principles involved. If you would like to be able to handle problems such as these more easily, consider enrollment in an advanced diver program, where you will not only increase your skills, but your knowledge of our wonderful activity. You can never know too much when venturing beneath the surface.

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Wreck Facts



BY ELLSWORTH BOYD

Another chapter is being added to one of the greatest sea stories of all time—the HMS *Bounty*, burned off Pitcairn Island in 1789 after Fletcher Christian and his crew mutinied against the infamous Captain William Bligh. An Australian dive team, backed by three Australian states and the Netherlands, has recovered over 200 artifacts from HMS *Pandora*. Captained by Royal Naval officer Edward Edwards, the 24 gun frigate set sail for Tahiti over a year after the mutiny to try and find the *Bounty*'s crew. Edwards reached Tahiti and captured 14 crewmen. Three were hanged and the rest put in chains while the *Pandora* searched the Coral Sea for the *Bounty*.

Edwards' frigate struck a reef in August 1971, while trying to sail through Torres Strait, the route mariners use in passing between Australia's northernmost point, Cape York and New Guinea. Edwards was unharmed, but 31 lives were lost.

In 1977, Australian divers found traces of the *Pandora* in 100 feet, southeast of Thursday Island, not far from the deep water passage listed as Pandora Entrance on modern charts. Lack of financial backing kept divers from pursuing their discovery, but now they are funded and working from a trawler converted to a diving salvage rig. Artifacts from the nearly 200 year old wreck will be displayed in Australia and the Netherlands.

Divers from the National Park Service completed exploratory dives on the battleship, USS *Arizona*, the worst casualty of the attack on Pearl Harbor, December 7, 1941. A memorial dedicated to the 1,177 men who went down with the ship, the *Arizona* needed to be inspected for rate of deterioration and removal of clumps of black powder—an explosive hazard stuck to the hull. Underwater photos and videotapes of these dives are now part of the exhibit at the visitor's center constructed over the wreckage.

The Second Annual Greater Ft. Lauderdale Shipwreck Symposium will be held July 31 to August 4 and promises to be just as exciting as the first. Last year's inaugural set a precedent for hosting shipwreck divers from all over the United States and several foreign countries. The Marine Archaeological Advisory Council, Broward County Florida hosts the symposium with one major objective in mind: to assemble sport divers, salvors and marine archaeologists for films, lectures, dives and discussions that will foster understanding and appreciation for all shipwrecks. Mel Fisher, Bert Kilbride, Dimitri Rebikoff and many other celebrities will be there. For details contact Jeff Pollard, Chairman, Shipwreck Symposium, 1005 A-1-A, Hillsboro Beach FL 33062; phone (305) 785-1528.

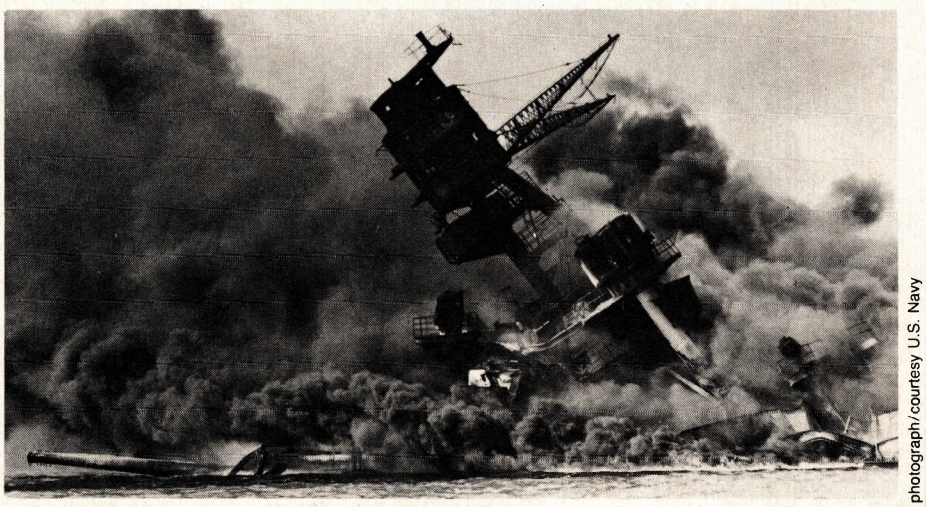
Derrick Guy, Thomaston, Georgia asks about the *Evening Star*, a ship that went down off Georgia not long after the Civil War ended. She was a steam sidewheeler, 2,014 tons, built in 1863. The *Evening Star* foundered in a storm on October 3, 1866 about 100 miles off Tybee Island, Georgia. There were 247 lives lost. You might try the National Archives and Library of Congress, Washington, D.C. for further details.

John Scalia, Hammonton, New Jersey wants to set the record straight on a ship some call the *Cayru*. John writes: "New Jersey divers explore a ship they call the *Cayru*, but it is just another unidentified Jersey wreck. The freighter *Cayru*, 390 feet long, 54 feet wide, was built in 1919 at Hog Island, Pennsylvania by the American International Shipbuilding Corporation. Originally named *Chickasaw*, she sailed under the U.S. Board of Shipping until 1930 when she was bought by Moore-McCormack and renamed *Scanmail*. In 1940 she was sold again, this time to Lloyd-Brasileiro Shipping Company of Brazil, and named *Cayru*. In March, 1943 the *Cayru* was torpedoed by the Nazi sub *U-94* and sank approximately 130 miles south of New York. The true *Cayru* has never been found."

Dan Clark, Bricktown, New Jersey, asks about the *Ida-K* that he thinks is wrecked somewhere south of Sandy Hook, New Jersey. I can't find any information on this vessel, Dan, but you might contact: Jim Cummings, 200 Kane Court, Joppa, MD 21085. Jim has compiled a computerized list of over 1,000 wrecks from New Jersey to South Carolina. He has been working on this project for several years and might be able to help you.

Dave Shilling, Ada, Ohio reveals some enlightening facts about salvage off the shores of the Buckeye State. Dave writes: "Some of us in our club, the Lima Scubanauts, like to salvage things from Lake Erie, the St. Clair River and quarries in our area. In our search for a snowmobile in a local lake, we struck up a con-

(Continued on Page 134)



photograph/courtesy U.S. Navy

The USS *Arizona* burns after the attack on Pearl Harbor, December 7, 1941.

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DIVING MEDICINE

BY ALFRED A. BOVE, M.D., Ph.D.

This month we feature an article by David F. Donavel of Amesbury, Massachusetts. His article is timely and important. Back problems plague a large number of people and cause a significant amount of disability, loss of work and recreation. Diving in many ways is good for people with back problems because the weight of the body is removed by the buoyancy of the water. There are still important precautions for diving after you have had a back problem and Mr. Donavel addresses these precautions in the following article.

BEATING BACK PAIN

Low back pain is one of the more common chronic ailments and, because of weightbelts, one to which divers are especially susceptible. Hauling heavy gear and strapping 30-40 pounds around your waist is risky. Even fit and healthy divers are often stiff at the end of the day. Divers with a history of back pain can be out of action for weeks and even if you've never had trouble, you're not immune. By taking some simple preventive measures, however, you can forestall most problems, even if you've had past difficulty.

Everyone knows but few follow the common advice about lifting with your legs, not your back. Tanks and weightbelts are heavy enough to do you in. Always be sure you've got a good grip on whatever you lift and use your legs. Always keep what you're lifting close to your body. Some diving instructors teach students to put on tanks by flipping them over their heads: Don't. Have your dive partner assist you or put your tanks on a stable, flat surface and strap yourself in.

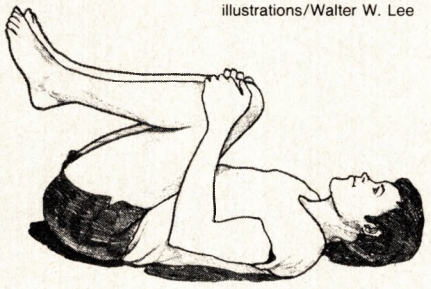
Put on your weightbelt by standing in front of it, stooping and, using your legs, lifting it up. Don't swing it around your back as you might do with the belt that holds up your trousers. Not only do you put yourself at risk, but it's possible you'll smack the person behind you or, perhaps worse, his camera equipment.

As important as lifting correctly, especially for the diver whose back is already compromised, is stretching out before and, more important, after a dive. Like tennis, cycling or running, diving is a sport and as such it makes demands upon your body. If your body can't meet those demands, it will break down, keeping you in bed and out of the water. A good stretch is particularly important between a long car or boat ride and a dive since your muscles have probably stiffened. A good stretch, however, is not a painful, bouncing affair. In fact, stretching to the point of pain or bouncing only tears tissues and, because of your reflexes, tightens the muscles you intend to loosen. Always stretch gently until you feel a slight tension that slowly diminishes as you hold the stretch position.

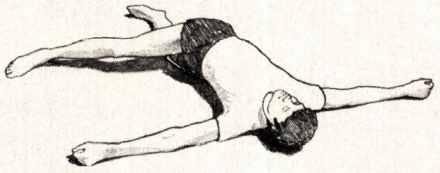
There are stretching exercises for all parts of your body, but the areas upon which you will want to concentrate for low back pain are your lower back, your hamstrings (back of legs) and your quadriceps (those big muscles in the front of your thighs).

Exercise I: Stretch your lower back by lying on your back and bringing your knees to your chest. Hold the position for 20-30 seconds, straighten your legs, then repeat four or five times. If this is painful, start by pulling one leg up at a time, then try both. This tucking position is easy and useful in the middle or end of a dive.

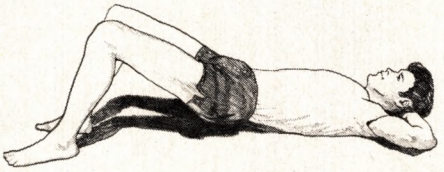
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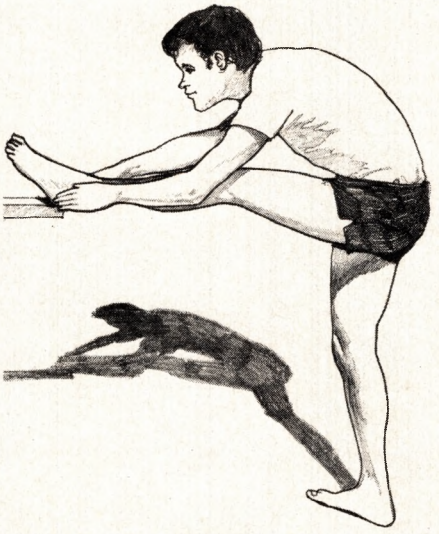
Exercise II: Another good low back stretch again involves lying on your back. Keeping your shoulders and back flat, cross one leg over the other holding the crossed foot just off the floor. You'll feel a tension from your lower back through the buttock and thigh of the lifted leg. Hold that for 20-30 seconds and repeat the stretch four or five times.



Exercise III: A lower back exercise you can use even when sitting or standing, the pelvic tilt, is nevertheless best done like the others, lying on your back. Simply tighten your buttock and abdominal muscles at the same time. Hold for about 30 seconds, relax and repeat four or five times. This exercise will help reduce tension on tired lower back muscles and forestall debilitating pain.



Exercise IV: In order to stretch your hamstrings, stand up, resting the back of one heel on something about waist high and stable. The foot on the ground should be pointed ahead and the support leg should be slightly bent. Now gently bend forward from the waist, looking straight ahead. Hold about 20 seconds and repeat. Remember not to stretch to the point of pain. The tension you feel should be distinct but pleasant.



Exercise V: Like hamstrings, quadriceps are stretched from a standing position. Raise your right foot behind you and hold the top of it in your left hand. Gently pull your heel toward you. Hold this for about 30 seconds. Repeat. Stretch your left quad by holding your left foot in your right hand. You may find it necessary to keep your balance by holding onto something with your free hand. In stretching your quads or in doing any stretch, re-

(Continued on Page 81)

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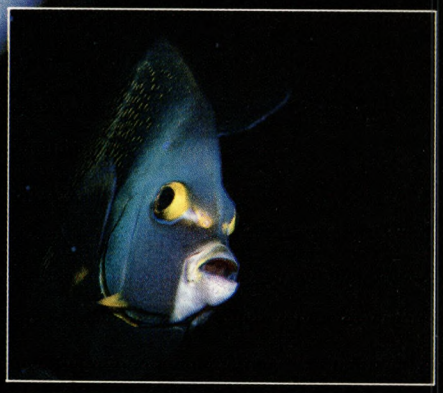
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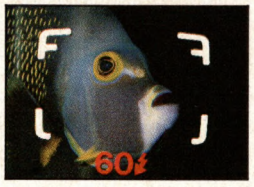
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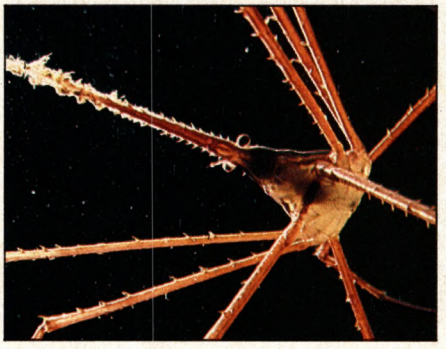
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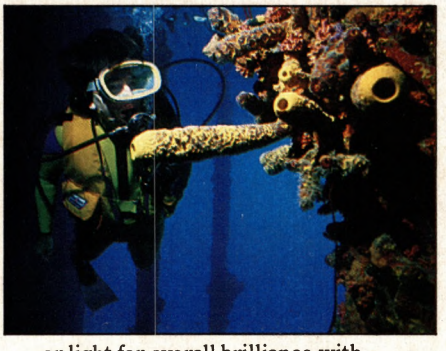
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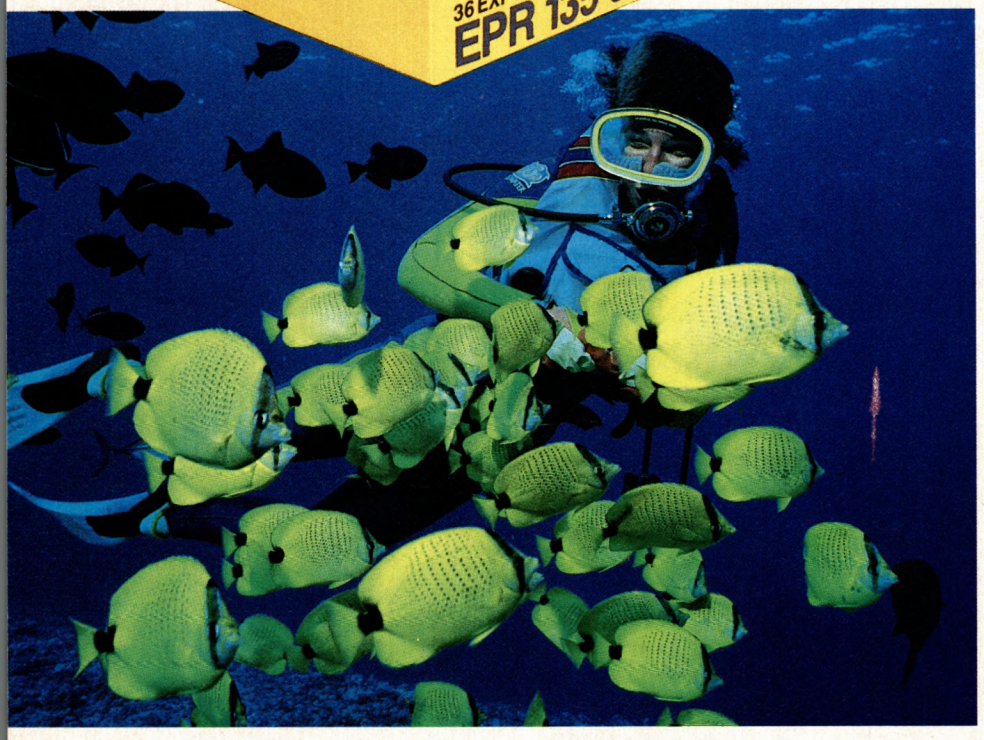
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Right: A cluster of nudibranch eggs, Hawaii—Pro Ektachrome 64, Nikonos V camera, 28 mm lens, 1:3 extension tube, SB-103 strobe, f22. Bottom: Cathy Church with lemon butterflyfish, Hawaii—Nikonos V, 15 mm lens, f8, SB-102 strobe.



Film Test: Professional Ektachrome 64

TEXT AND PHOTOGRAPHY BY JIM AND CATHY CHURCH

Kodak's Professional Ektachrome 64 color slide film (EPR) has been the choice of many U/W photographers for years. While some may favor other fine films, EPR offers some interesting advantages you should consider.

Professional films are subjected to tighter quality controls. The color balance of any slide film changes with time and the actual ISO film speed can vary with different batches of film and with time. Thus, color and film speed are the two variables Kodak controls more closely with professional films.

EPR is kept at the factory until it reaches its optimum color balance. Each batch (identified by the emulsion number on the film carton) is tested for speed and the actual ISO (to the nearest one-sixth) is stamped on the instruction sheet inside the film carton. This rating may be ISO 50, 64 or 80. The film is sold only to dealers who keep it refrigerated at 55°F (13°C) or lower. This virtually stops the changes in color balance and film speed with age. Thus, the greatest advantage of a professional film is its consistency. With unrefrigerated consumer films, color balance can shift and the actual ISO can vary by about one-third stop from batch to batch, depending on age and storage.

In clear, bright water, ISO 64 is a good middle of the road choice. Slower films may be sharper and more colorful, but require more light. Faster films require less light, but usually have more grain. ISO 64 is usually fast enough for most wide angle photography in reasonably clear water. In 25 to 35 feet of clear Caribbean water, for example, you can expect sunlight apertures of about f5.6 at 1/90 second with level camera angles. Slightly upward angles will require about f8 and upward angles at 45 degrees will need about f11 to 16. These apertures provide adequate depth of field with wide angle lenses. With the Nikonos 35 mm lens, however, Ektachrome 100 is usually a better choice because you can close the aperture an additional two-thirds stop which increases depth of field.

During our seminars, we project a wide angle Kodachrome slide on the left screen—it shows Cathy posing by a coral head encrusted with bright red and yellow sponges and a blue water background. Cathy points out how sharp the image is and how bright the colors are. For emphasis, she pauses while Jim refocuses the projector. Then, after everyone has accepted the Kodachrome blue background, we project an EPR slide of the same subject on the right screen. Suddenly, in comparison to the EPR slide, the Kodachrome bluewater background now appears purple. The EPR slide looks bright and clean.

However, the Kodachrome is sharper, the reds are richer, yellows and skin tones are warmer. Thus, if sharpness and brighter colors are more important to you, the Kodachrome slide is best. But if you want a slide with a clean, blue background, the EPR slide is best.

EPR isn't a contrasty film. This is an advantage when photographing a scene with a brightness range of several f stops from the darker to the lighter areas. A more contrasty film will tend to lose details in the highlights and shadows. As for latitude, we believe that any color slide film should be exposed within a half stop or less of the desired exposure. To increase color saturation, especially bluewater backgrounds, try exposing EPR at

ISO 50 (a one-third stop underexposure).

For close-ups of yellow sponges, white flamingo tongues and even red hermit crabs, Cathy prefers the cooler EPR color rendition. But for purple hermit crabs or the gold and purple ringed top shell, she prefers Kodachrome which renders the purple tones a reddish rather than a bluish purple. Color preference, of course, is a matter of personal taste.

If you have a housed camera and macro lens and a powerful strobe, you can expose EPR at about f22 or f16 with strobe-to-subject distances of about 9-16 inches. With a Nikonos and close-up lens and a strobe-to-subject distance of one foot, you can expose at f16 with medium power strobes and f22 with high power strobes. For Nikonos extension tube work and a small medium powered strobe, you set the Nikonos lens for f22 and hold the strobe about 3-6 inches from the subject with a 1:1 tube, about 4-8 inches with a 1:2 tube and about 5-9 inches with a 1:3 tube.

If large color prints of wide angle, normal angle or close-up subjects are your goal, use Kodachrome. But for projection, EPR is excellent and withstands projection (without color fading) longer than Kodachrome. When projected, the superior sharpness of Kodachrome is usually only noticed when fine details are shown, such as Christmas tree worm tentacles.

Slide shows are a major goal for us and all of the slides we show are duplicates unless we are comparing films on screen. With Kodak films, our best dupes have always been made on Kodak Ektachrome Slide Film 5071, from Kodak EPR originals. Our dupes from Kodachromes are usually too contrasty and the blue backgrounds go to a washed out purple.

PRO EKTACHROME 64
Basic exposure table

Apparent distance	Low power strobe/setting	Medium power strobe/setting	High power strobe/setting
1 foot	f8-11	f11-16	f16-22
1.5 feet	f8	f11	f16
2 feet	f5.6	f8	f11
3 feet	f4	f5.6	f8
4 feet	f2.8	f4	f5.6
6 feet	f2	f2.8	f4

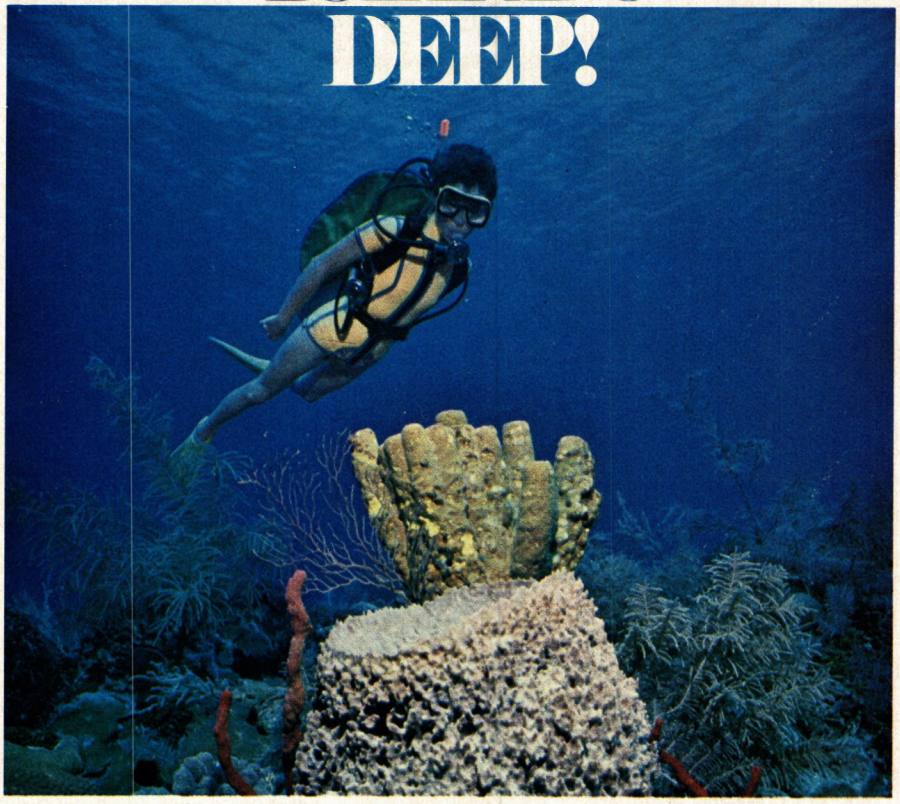
Apparent distance = strobe-to-subject distance in apparent feet.

EPR is designed for Kodak E-6 processing, the system most dive resorts offer. Providing the chemicals are fresh and the timing and temperature control precise, non-Kodak labs can process your EPR with professional quality. If you don't get bright colors, change processors. If you are processing at home, use fresh photo chemicals.

Purchase EPR at a professional camera store where the clerk must remove the film from the refrigerator or freezer at

(Continued on Page 136)

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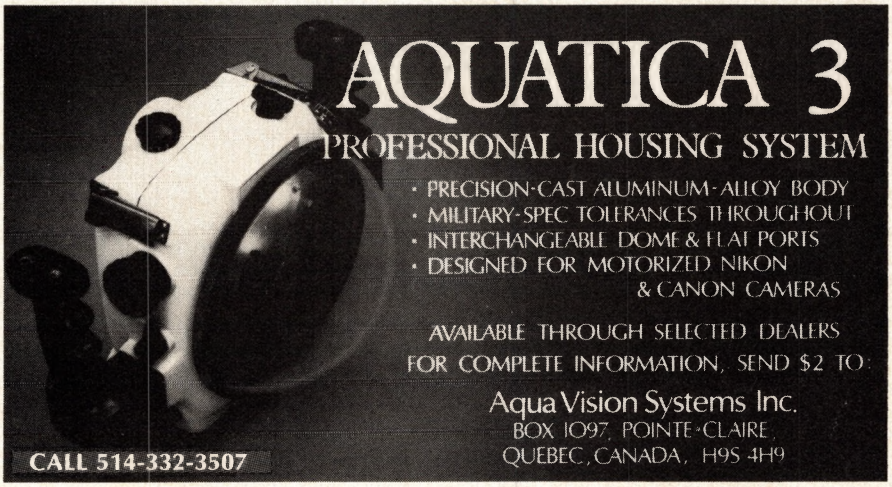
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Diver's Calendar

July 26 Deadline for registration for New England Divers' Fifth Annual Treasure Hunt, to be held August 4 on Cat Island, Marblehead, MA. (Contact: New England Divers, 131 Rantoul St., Beverly, MA 01915; (617) 922-6951)

August 16-19 Ninth Annual YMCA Scuba Convention at the Atlanta Airport Hilton in Atlanta, Georgia. Workshops, exhibts and more. (Contact: National YMCA Scuba Program, Oakbrook Square, 6083-A Oakbrook Parkway, Norcross/Atlanta, Georgia 30093; (404) 662-5172)

August 25 Underwater Treasure Hunt to benefit the Divers Alert Network, at Dutch Springs Quarry in Bethlehem, PA. (Contact: Robert J. Burns, 2200 Bristol Road, Warrington, PA 18967; (215) 343-6970 or Underwater World (215) 672-4180)

August 30-September 2 Montana Dive Council's Dive Fest '85, hosted by Electric City Dive Club at Holland Lake, Montana. (Contact: M. Habel, 927 2nd Ave. North, Great Falls, MT 59401 or call M. Michelotte (406) 452-4845)

September 6-8 Bahamas Free Diving Championships held at the Andros Beach Hotel. (Contact: Bahamas Sports Information (800) 32-SPORT or Neal Watson's Andros Undersea Adventures (800) 327-8150; in Florida and Canada (305) 564-8633)

September 7-8 Second Annual Underwater Fun Festival at Lake of the Woods in Klamath County. Proceeds go to the Klamath County Dive Rescue team. (Contact Sergeant Burns, Klamath County Sheriff's Office, Court House, Klamath Falls, OR 97601)

September 27 Deadline for entries in the Ninth Irish Open Festival of Underwater Photography, to be held October 5-6 in Limerick, Ireland. Sponsored by the Limerick Sub-Aqua Club. (Contact: P.F. McCoole, Maricopa, Revington Park, Limerick, Ireland)

September 27-29 Wreck Diver Course, near Atlantic City, NJ. Offered by R. Duncan Mathewson. (Contact: Atlantic Alliance for Maritime Heritage Conservation, P.O. Box 27272, Washington, D.C. 20038; (609) 646-5090)

October 19-26 Diving Accident and Hyperbaric Oxygen Therapy course on Grand Cayman Island. 26 hours of Category I CME credit. (Contact: Cindi Easterling, Box 3108, Duke University Medical Center, Durham, NC; (919) 684-6878)

October 27 Fifth Annual Underwater Pumpkin Karving Kontest to benefit the YMCA Family Stress Center for abused kids. Event held in Bonita Cove, Mission Bay, San Diego, CA. (Contact: The Wet Set (619) 578-DIVE)

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Technifacts

BY E.R. CROSS



The subject of this month's Technifacts began to unfold some 12,000 years ago when the Paleo-Indians first settled on the great Colorado Plateau. These dry, inhospitable lands stretch across the southern part of Utah and Colorado and the northern half of Arizona and New Mexico. By 800 A.D. four major cultures had emerged from the descendants of these early hunters; the Hakataya, the Hohokam, the Mogollon and the Anasazi.

The Hohokam were dam and canal builders and irrigators of crops. Some of their irrigation systems were still in use in the 18th century by Anglo farmers. The Anasazi, from which the Pueblo and the Hopi Indians probably evolved, built multi-storied and multi-room stone dwellings, some set on plateaus or high up on canyon walls. Others were built closer to the river level of the deep canyons. Many of these archaeologically important sites were inundated when dammed rivers flooded the ancient dwellings.

I have chosen to mention the work on the Anasazi sites for several reasons. First, the amount and kinds of archaeological material for study encompassed almost all kinds; stone, wood, leather, soils of various kinds and both worked and unworked sites. Also the Anasazi Indian culture has been one of my favorites for study since I dove some of the dams that flooded areas once roamed by this fascinating stone age civilization. Other archaeological studies on prehistoric and historic inundated sites across the nation are of equal importance and developed a corresponding amount of meaningful information.

ARCHAEOLOGICAL RESOURCES

In the brief span of a human life permanent changes in a river and its environs are usually not apparent unless a man-made structure makes gross alterations evident. But a careful study of any stream will reveal small variations in many facets of both the river and anything the flow of water encounters. River banks are slowly eroded away. Current patterns develop that cause shallow or deep pools to develop. The chop from wind driven waves

(Continued on Page 128)



Divers are very careful when it comes to choosing their equipment because so much depends on it.

That's why we're proud more and more divers are making Achilles their choice for a reliable dive boat.

We've earned the trust of divers by making quality boats. Boats that stand up to divers' rugged use. At a time when more and more inflatables are made with polyvinyl chloride (PVC), every Achilles boat is still made with durable DuPont Hypalon. That's because there's nothing better than Hypalon for toughening and preserving inflatable boat fabric.

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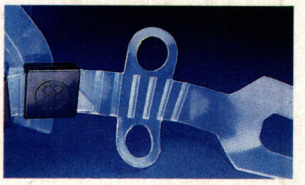
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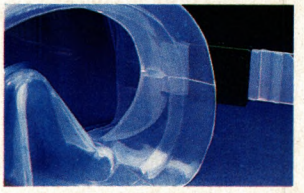
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Now we've developed a mask and snorkel that combine everything we've learned about making them, with everything Jean Michel Cousteau could tell us about using them (he was quite particular about fit, comfort and ease of use). The result: The JM Cousteau Signature Set. By far, the most advanced mask and snorkel ever produced. Made of space-age silicone, each offers an unprecedented array of comfort, safety and performance features. Many of which are patented exclusives you won't find on any other mask or snorkel. For more information, contact your authorized Aqua-Lung® Pro-Line dealer or U.S. Divers, 3323 W. Warner, P.O. Box 25018, Santa Ana, CA 92799-5018, (714) 540-8010.



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Low volume design, including tempered-glass lenses and impact-resistant frames, provides high peripheral visibility and easy clearing.

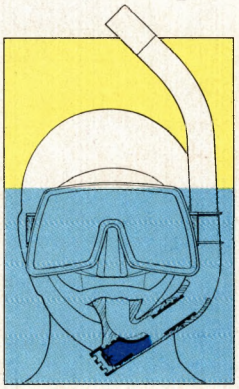




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U/W POKER SHOWDOWN

On August 3, the Colorado Front Range Scuba Diving Center will host the second annual Great Underwater Poker Showdown. Dive centers from Fort Collins, Boulder, Colorado Springs, Pueblo and Metro Denver are already committed to this year's event. Last year's dive netted $6,000 and this year organizers hope to double or triple that.

The event is a two part affair starting with the Underwater Poker game in which teams get $500 in donations to participate. Members of the local media will also play each other at this time. The team members will play for 45 minutes, starting out with the $500 in fictional chips. At the end of the day the team that fared the best will receive the Traveling Trophy.

The second part of the event is the auction of donated scuba gear. This will bring in the most people and bargains are there to be had.

The money raised by this event will be used to help the more than 1,500 patients in Colorado who have one of the 40 diseases covered by the Muscular Dystrophy Association.

DAN COURSE

The sixth Diving Accident and Hyperbaric Oxygen Therapy course will be held October 19-26 on Grand Cayman Island. The course will be directed by Dr. Peter Bennett and is endorsed by the UMS and approved by the Duke University School of Medicine for 26 hours of Category I CME credit.

For more information contact Cindi Easterling, P.O. Box 3108, Duke University Medical Center, Durham, NC; (919) 684-6878.

All proceeds from the course will go to support the Divers Alert Network (DAN).

AQUA-WOMEN

The Long Island Divers Association will sponsor its annual Expedition Aqua-Women, a deep water dive by 25 women, on August 4. This year's expedition will sail from Freeport, Long Island aboard the new *Sea Hunter III*, a 55 foot boat captained by Sal Arena. The destination will be the 13,000 ton World War I heavy cruiser USS *San Diego*, sunk by enemy fire on July 19, 1918. The *San Diego* lies in 110 feet of water south of Fire Island, Long Island.

This dive is considered by many to be one of the most challenging on the East Coast. The chilled waters and uncertain visibility coupled with the condition of the wreck adds to the excitement of the dive. In accordance with nautical tradition the conclusion of every successful voyage ends with a cup of cheer and the opportunity to expound on one's exploits.

SHIPWRECK SYMPOSIUM

The Marine Archaeological Advisory Council of the Broward County Historical Commission is hosting the second annual Greater Ft. Lauderdale Shipwreck Symposium July 31-August 4. It will be held at the Pier 66 Hotel and Marina in Ft. Lauderdale, Florida.

Marine archaeologists and treasure hunters will meet to debate and give their views on the controversial issues surrounding shipwrecks. Mel Fisher, Robert Marx, Peter Throckmorton and Bert Kilbride are expected to appear. Also present will be pioneers of the marine technology field, including Dr. Harold Edgerton and Dimitri Rebikoff.

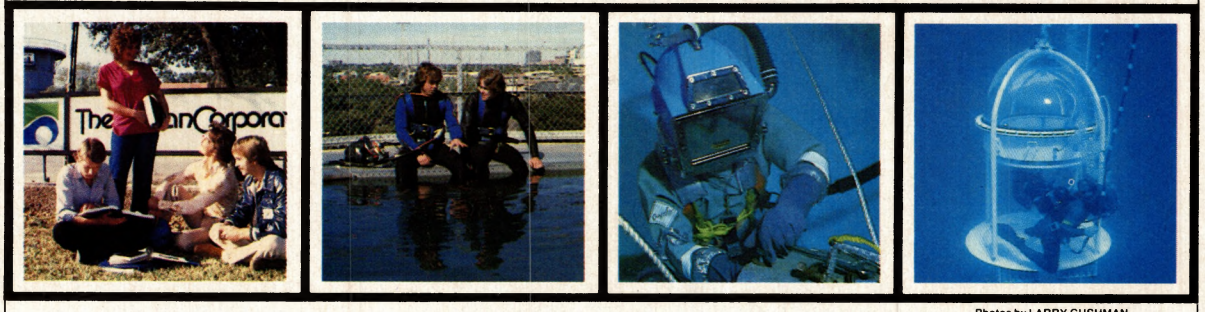
Treasure and archaeological exhibits, films, lectures and workshops will all be offered during this four day event, along with some of the best wreck diving the Gold Coast has to offer.

Wreck Diver and Archaeological Diver certifications will be available.

For more information please contact the Broward County Historical Commission, 100 South New River Drive, Fort Lauderdale, FL 33301; (305) 765-5872.



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Photos by LARRY CUSHMAN

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DIVE RESCUE '85

Dive rescue professionals and public safety divers from all over the United States, Canada, Europe, Australia and the Far East will converge on Fort Collins, Colorado this summer, when the International Association of Dive Rescue Specialists will host its first conference. Dive Rescue '85 will be held at Colorado State University, near the association's headquarters, July 7-12. Members of police, fire and emergency rescue agencies will participate in workshops, hear nationally renowned experts in the fields of diving and water safety and swap pointers with a diverse group of water rescue experts.

For additional program information call the International Association of Dive Rescue Specialists, (303) 482-0887.

WRECK DIVER COURSE

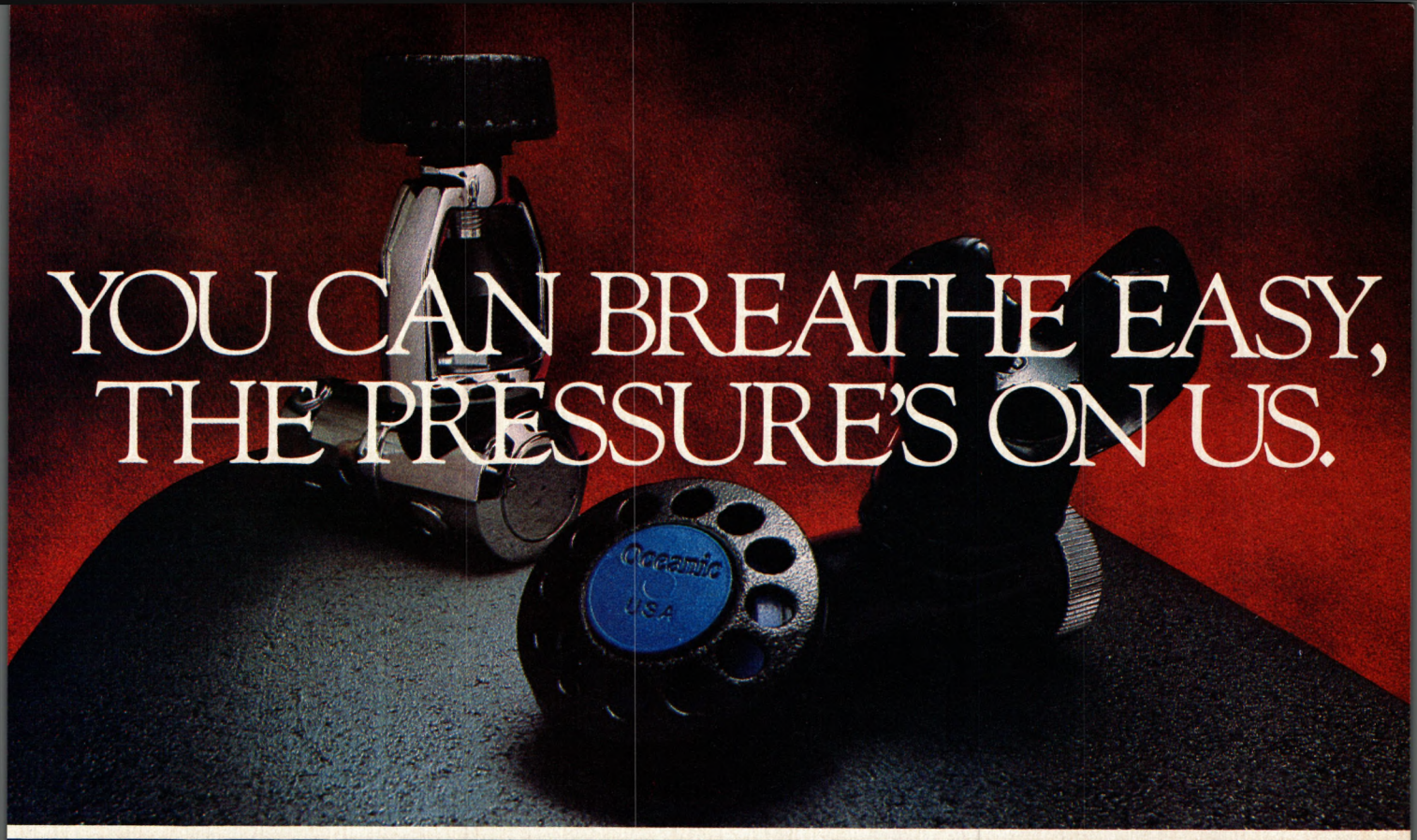
R. Duncan Mathewson, noted marine archaeologist, is continuing his national seminars for wreck divers on underwater archaeology near Atlantic City, New Jersey September 28-29.



Mathewson, a signficant contributor to the successful treasure find of the *Atocha* and *Margarita* is being sponsored by the Atlantic Alliance for Maritime Heritage Conservation.

The course, which covers basic field evaluation, artifact identification, preservation and pre-exploration research methods—and includes pool work for a simulated site investigation—will cost $120. The course qualifies those who complete it for NAUI and PADI Archaeological Research Diver I certification.

For registration and information contact: The Atlantic Alliance for Maritime Heritage Conservation, P.O. Box 27272, Washington DC 20038; (609) 646-5090.



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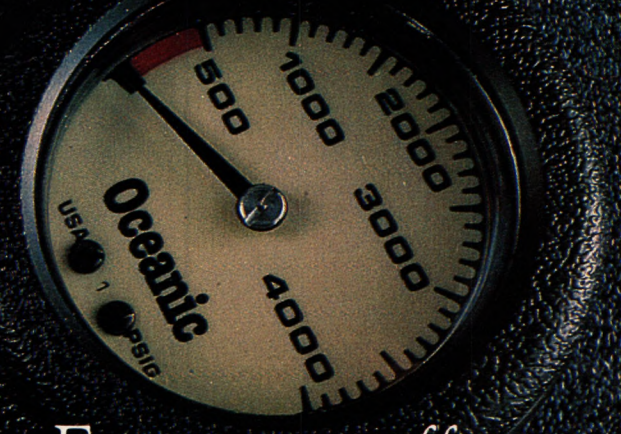
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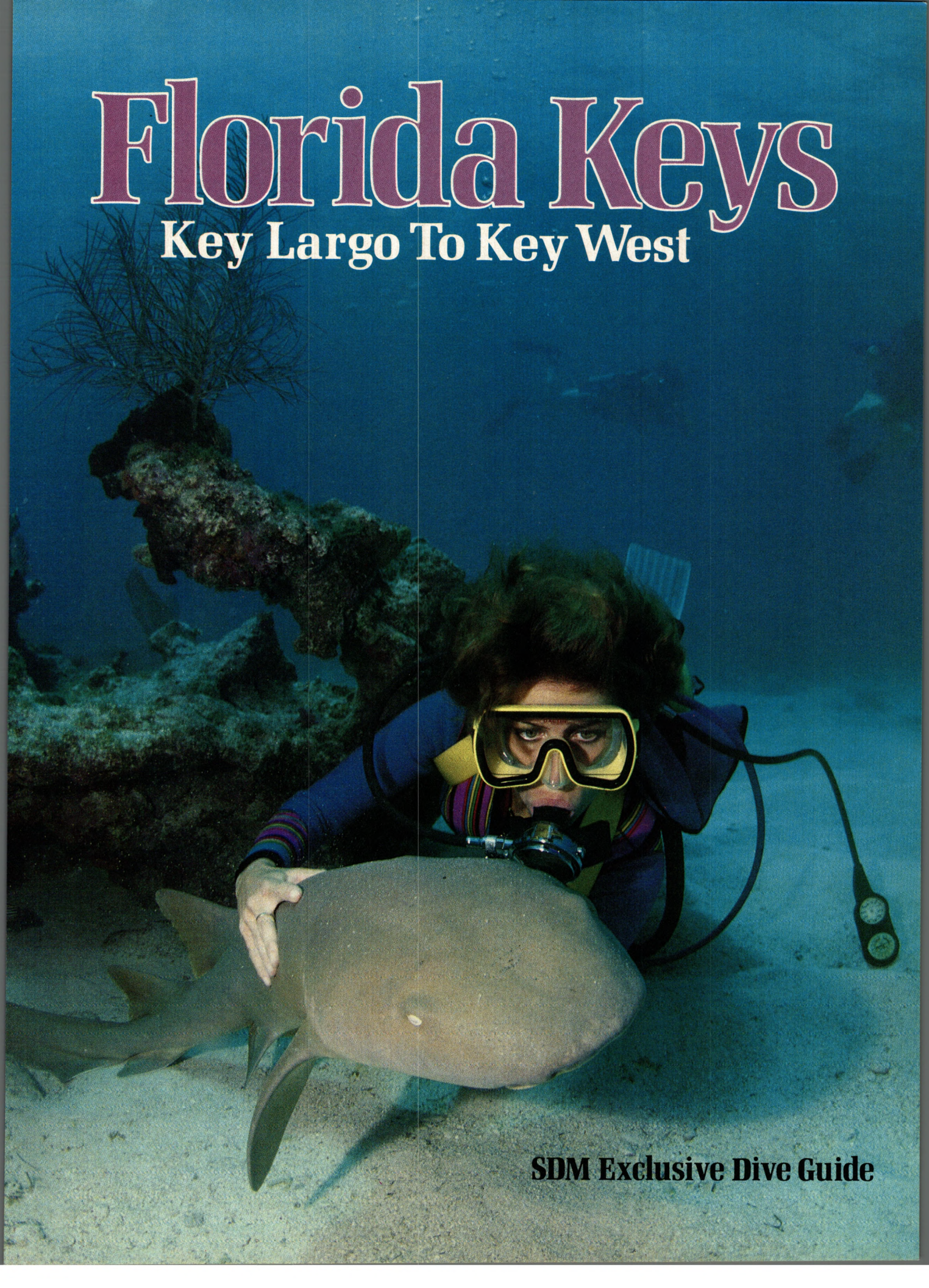


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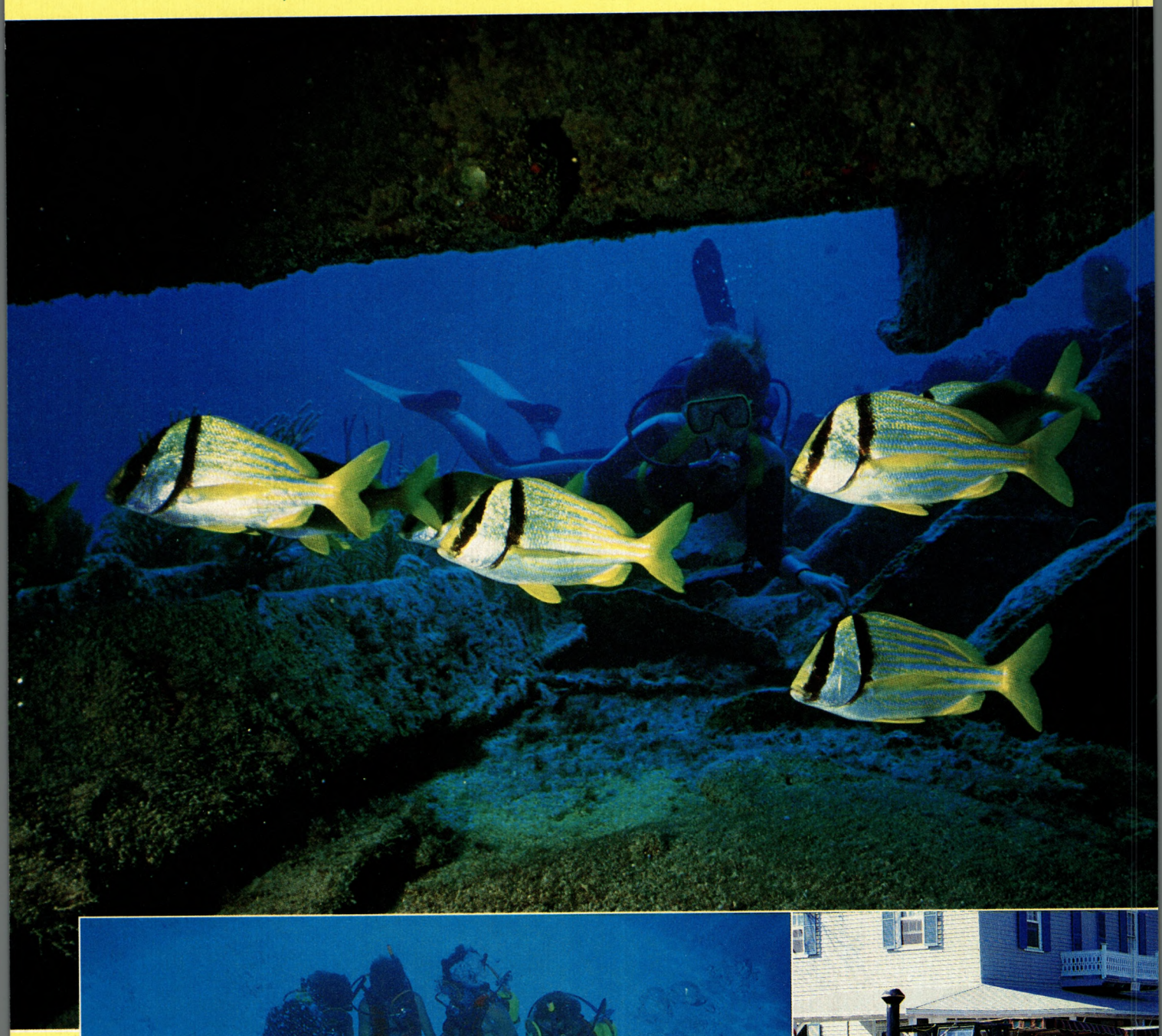
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Florida Keys

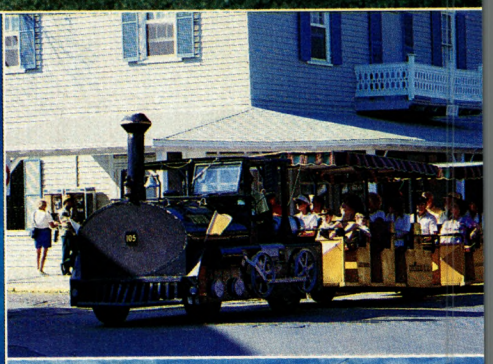
Key Largo To Key West



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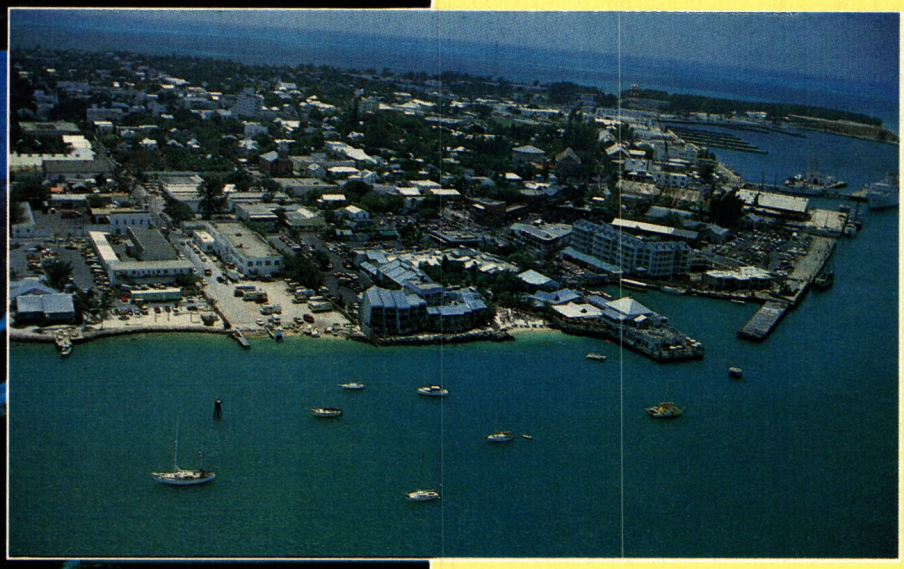


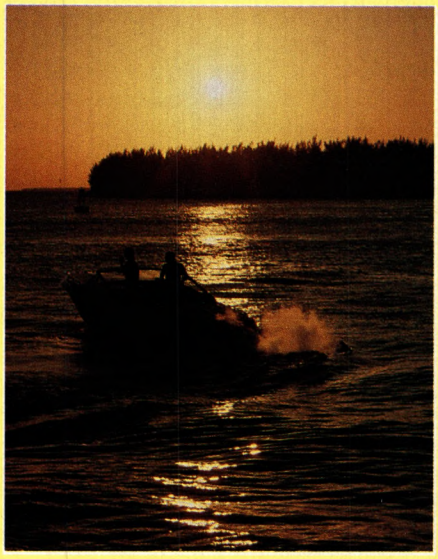






Florida Keys





Follow America's Highway To A Coral Paradise

TEXT AND PHOTOGRAPHY BY STEPHEN FRINK



Divers and other tourists are visiting the Florida Keys in record numbers. Reachable by car, this American playground offers a host of topside and U/W activities. Top: *Benwood* wreck, Pennekamp. Inset: Downtown Key West. Top right: Key West sunset. Above: Shipwreck, Molasses Reef. Left: Scuba instruction; Conch Train; Theater of the Sea, Islamorada.

"Tourists flocking to the Keys in unprecedented numbers" proclaims a recent headline in the Miami Herald. This year has been the best tourist season ever for the Florida Keys and the editorial hypothesis attributes this influx of visitors to improved highway access with significantly better bridges connecting the various Keys, lowered gas prices, a stronger national economy and a resurgence of patriotism and national pride in this geologically unique vacation paradise. While general tourists may be just discovering the fun and sun which so characterize the Florida Keys vacation experience, divers and other watersports enthusiasts have long recognized the Keys as a premier destination.

A grouping of over 200 small, flat, generally rocky islands, the Florida Keys stretch some 180 miles from Biscayne Bay in the north to the Dry Tortugas in the south. On the north and west these islands are bounded by the shallow waters of Florida Bay and the Gulf of Mexico; to the east and south lies the Atlantic Ocean with the warm, blue waters of the Gulf Stream. In ancient times these islands were but patches of coral awash in a warm southern sea, but as the seas receded they became islands as other coral reefs were formed farther offshore. More than any other plant, the vast mangrove communities surrounding most of the Florida Keys have served to anchor and protect the islands from the forces of the sea, at the same time providing breeding grounds for many dazzling reef residents so common just offshore.

The first residents of the then austere and primitive islands were the Calusa Indians. While fresh water was sparse, sea life was abundant and these tribes flourished until the Spanish subjugated and weakened them with their alien diseases. The Spanish attempts at colonizing Florida were generally ineffective, especially so in the Keys, but the shipping lanes offshore were of great value and Spain maintained her interest until 1762. In that year British troops captured Havana and Spain ransomed all of Florida for it in 1763. In 1783 Britain returned the region to Spain rather than have it seized by the young United States. In 1818, the United States bought all of Florida from Spain for $5 million.

Many of the early settlers in the Florida Keys were from the Bahamas and since the queen conch was a food staple, these immigrants were derogatorily referred to as conchs (pronounced conks) by the mainlanders. The descendents of these settlers bear the name conch with pride today and Monroe County is often referred to as the Conch Republic.

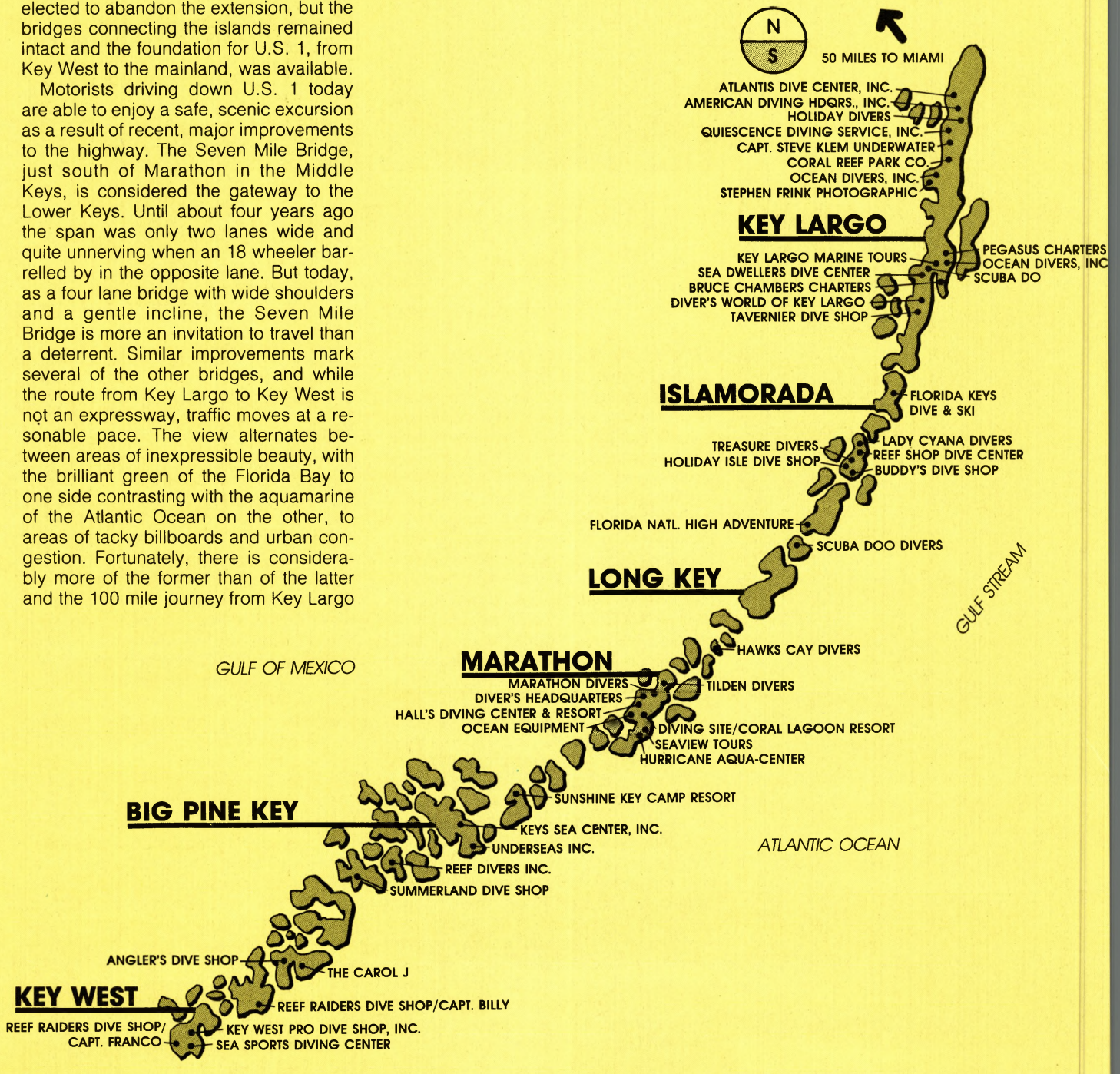
Any historical perspective of the Florida Keys has to mention the Florida East Coast Railroad, since the concrete ribbon of highway, U.S. 1, which connects the

Florida Keys

Florida Keys to mainland Florida, was built to a great extent on the bed of that railway. Running from Homestead to Key West, the railroad was an extension of a broader system built in the 1800s by Henry Flagler as a link between Florida's major seaboard cities. Railroad construction throughout the Keys began in 1904 and took eight years to complete. For 23 years "the railroad that went to sea" offered an 11 hour trip from Miami to Key West, losing money all along the way. Finally, in 1935 a hurricane tore up so much of the track that railroad officials elected to abandon the extension, but the bridges connecting the islands remained intact and the foundation for U.S. 1, from Key West to the mainland, was available.

Motorists driving down U.S. 1 today are able to enjoy a safe, scenic excursion as a result of recent, major improvements to the highway. The Seven Mile Bridge, just south of Marathon in the Middle Keys, is considered the gateway to the Lower Keys. Until about four years ago the span was only two lanes wide and quite unnerving when an 18 wheeler barrelled by in the opposite lane. But today, as a four lane bridge with wide shoulders and a gentle incline, the Seven Mile Bridge is more an invitation to travel than a deterrent. Similar improvements mark several of the other bridges, and while the route from Key Largo to Key West is not an expressway, traffic moves at a resonable pace. The view alternates between areas of inexpressible beauty, with the brilliant green of the Florida Bay to one side contrasting with the aquamarine of the Atlantic Ocean on the other, to areas of tacky billboards and urban congestion. Fortunately, there is considerably more of the former than of the latter and the 100 mile journey from Key Largo to Key West will, ideally, be broken up with visits to the public beaches, watersports concessions, restaurants or any of the hundreds of interesting diversions that dot the roadside.

Directions in the Florida Keys can be confusing since many people think of the Keys as running due south from the mainland. In reality the Keys drift to the southwest and U.S. 1 is often running more east-west than north-south. However, it is hard to get lost as all inter-Keys transit is accomplished via U.S. 1. As long as you know the Mile Marker number of your destination, it is easy to find. Mile Markers are small, green, informational signs along both sides of the roadway with the sequence originating in front of the Monroe County Courthouse in Key West with 0 and terminating one mile south of Florida City at 126. If you are driving along U.S. 1 and the Mile Marker numbers are getting larger, you are headed toward Miami and if the numbers are decreasing, you are headed toward Key West. The major centers of population are the Upper Keys, which range from MM 106 to 85, the Middle Keys from MM 55 to 45 and the Lower Keys from MM 12 to 0. There are resorts, dive stores and other businesses outside these general centers of commerce, of course, and they usually include their Mile Marker numbers in their address. They may even use the half-mile figure in the address, such as MM 102.5.



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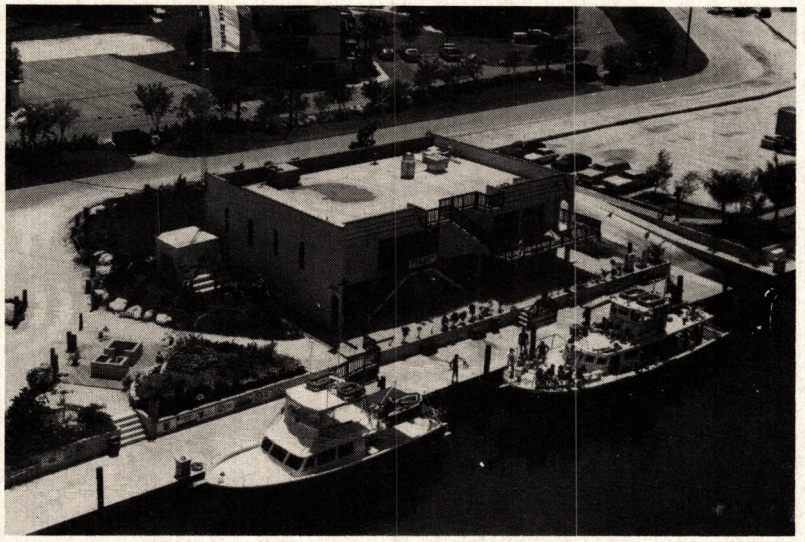
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Florida Keys

Weather can be an important consideration in planning a trip to the Florida Keys, but average statistics can be misleading. For example, the National Weather Service claims the Florida Keys will experience 27 inches of rainfall during an average year and the mean annual temperature is 75°F. For divers, the average underwater lateral visibility is probably 50 feet and the average water temperature about 78°F. The average sea condition is a two to three foot chop. More importantly, there are two distinct seasons—summer and winter—and both topside and underwater average conditions are significantly different in each.

During the winter, the average air temperature is about 71°F but afternoons with temperatures in the 80s are not unusual. This warm air is displaced three or four times during the season by short cold spells as northers reach down from Canada. During these brief interludes the nighttime lows may reach the low 40s, but the days are usually crisp and bright. For the most part, the winter in the Keys is a beautiful time and a look at headlines about sub-zero temperatures and numbing wind chills throughout the rest of the country reconfirms the Florida Keys as a sanctuary of tropical bliss.

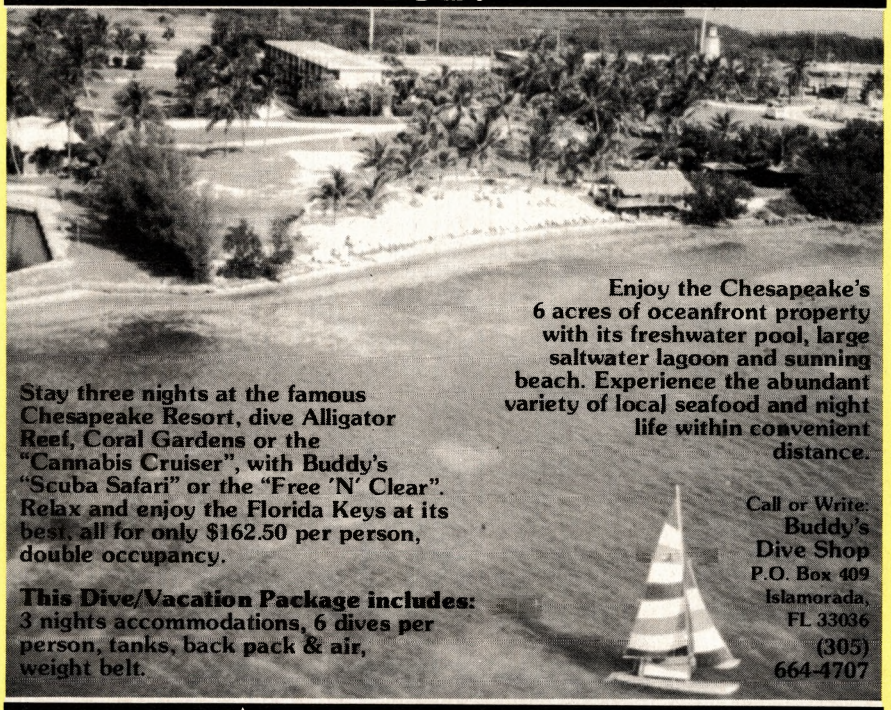
The winter diving season is marked by water temperatures that range from the upper 70s to a seasonal low of about 69°F. Coral does not live in waters below 68°F and the Florida Keys is the only place in the continental United States with water warm enough and waters clear enough to foster the photosynthetic process necessary for coral to flourish. When the northers pass through, with their accompanying high winds, the seas can be churned up enough so the boat ride to the reef can be uncomfortable and the visibility reduced. Fortunately, these extreme conditions are not the norm and will pass in a few days. The traveler planning to visit the Keys for just a day or two during the winter can possibly be caught in one of the cold fronts and experience less than ideal conditions. This is unfortunate because that traveler's recollection of Keys diving conditions is not truly representative. It is more appropriate to plan a winter visit of five to seven days. Most of the diving days will be quite lovely, some even spectacular. On a good day the winter water visibility can be 80 feet or better and the average day will feature 40 feet. The dive operators probably send their dive boats out at least 330 days per year. The Florida Keys offer many more activities than most other destinations for non-diving days.

The summer season features air temperatures that will reach into the 90s but are moderated by cooling tropical breezes. The average temperature is just 82°F, just about equaling the water temperature for that time of year. The summer water temperature at the reef will range from the low to upper 80s. The only reason to wear a wetsuit is for protection from abrasion or sunburn. The water is also much clearer in the summer with 50-60 feet being average and occasional days of 100 feet plus. The seas generally range from flat calm to a two foot chop. It is quite unusual to lose a day of diving to weather during the summer. The consistency of excellent diving conditions coupled with generally lower hotel rates for the summer season make the Keys an especially attractive dive destination from May through September, yet the Keys are usually more crowded with tourists from December through April as thousands seek respite from the arctic conditions blanketing the North.

While there is a distinct "island" feel to the Florida Keys, many of the hassles of foreign travel are absent. Obviously, no passports are required of U.S. citizens, the primary language will be English, the currency will be the U.S. dollar and the electrical service will be 110 volts. The advertising catch phrase has been "the tropical islands you can drive to" and because of this easy auto access many diver's first open water experience has been in the Florida Keys. Because there is such a wide variety in experience levels, many of the dive stores now ask to see logbooks as well as certification cards. Most dives are in the 25-40 foot range and are equally exciting for novice or experienced divers. Many operators, however, offer more challenging dives to wrecks in more than 100 feet of water; drift dives; or all day dive safaris. For these special dives it is necessary to get a feel for a diver's level of experience. A logbook might make your trip to the Florida Keys run smoother. Accommodations in the Florida Keys cover a wide range including guest houses, condominiums, hotels, motels, botels, trailer parks, campgrounds and full resort complexes with an emphasis on dive/lodging packages. Virtually any level of, or lack of, luxury, is obtainable at correspondingly variable prices, so a call to the local dive store is a good way to circumvent confusion. Many of the dive stores have packages with nearby resorts or hotels and can save the diver substantial amounts compared with booking both diving and lodging separately. Many of the dive store booking offices now feature toll free reservation numbers so it costs nothing to inquire in advance.

The restaurants of the Florida Keys feature even greater diversity than the accommodations. Virtually any national specialty such as Italian, Mexican, French, Chinese, Japanese, German or Polynesian is obtainable somewhere in the Keys and more traditional seafood

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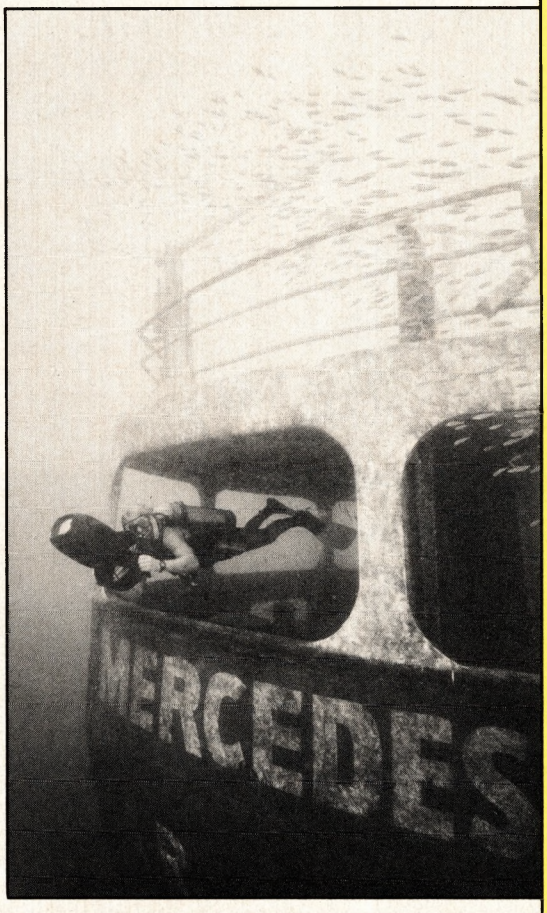
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Florida Keys

fare is available everywhere. Night life is better developed in the Keys than it is in most dive destinations, with bars (often featuring live entertainment), movie theaters, dive store sponsored slide shows and barbecues, and color cable TV in most hotels. Each community will have some *après* dive activities, but Key West features the best party potential overall.

While diving is the largest drawing card to the Keys for watersports enthusiasts, there are ample other attractions as well. Anglers began fishing the Florida Keys in the early 1900s, especially for the tarpon and bonefish so prevalent in the back country (in the Florida Bay). In the late 1940s offshore game fishing began to take off owing to improvements in boat design and tackle. Today, the keys are world renowned not only for the permit, bonefish and tarpon found in the flats, but also for sailfish, blue and white marlin, swordfish, grouper, snapper, amberjack, blackfin tuna, wahoo, mackerel, dolphin and even shark.

For sailers and windsurfers, there are endless hours of quiet adventure navigating the massive areas of ocean just off the Florida Keys. There are numerous public boat ramps, marinas and rental facilities for either power or sailboats, sailboards and even jet skis. Several places in the Keys also rent canoes, one of the best ways to tour the extensive mangrove communities surrounding the islands. On a day that might be too windy to dive, it can be both fun and educational to take a small boat through the labyrinth of mangrove canals and perhaps snorkel beneath the roots. There one can find a complex community including blue crabs, juvenile angelfish, snapper, grunt, grouper, barracuda, rays, various species of sponge and invertebrate life, snook, Atlantic spadefish and an array of crustaceans. While the mangrove dive may not be as dramatic as the coral reef, it has its own very distinct beauty and at least a perfunctory visit should be included in any Keys diving itinerary.

All along the Florida Keys, from four to six miles offshore, lies a magnificent coral complex fringing the edge of the continental shelf. Few, if any, reefs are within swimming distance from shore and all the beach diver is likely to see is sand, turtle grass and occasional tropicals. The exception to this occurs in the mangrove areas and in some instances around bridge pilings. However, diving around the bridges is rather dangerous because of heavy boat traffic and strong tidal currents. For the most part, Keys diving is boat diving and the dive operators of the area have established an impressive fleet to transport the throngs of enthusiasts. The average U.S. Coast Guard approved dive boat in service in the Keys will range

from 40 to 65 feet in length and accommodate from 6 to 48 divers. The captains of these vessels will be Coast Guard licensed and most of the crew these days are first aid and CPR trained. Most boats will be equipped with full dive platforms, freshwater camera rinse tanks, tank racks, sundecks, stereo, VHF radio and oxygen for diver safety. This is probably the most sophisticated fleet of dive boats anywhere in the world and the emphasis upon safety among the operators is very strong. The Keys Association of Dive Operators (KADO) is a professional organization to which the majority of the dive stores and boat handlers belong and the establishment of uniform safety standards is among their primary concerns.

Divers on a Florida Keys commercial dive boat are usually not accompanied in the water by a crew member/divemaster as might be common in the Caribbean. The reason is most of the divers tend to spread out almost randomly over the shallow reefs and it would be impossible to keep track of the group without instituting unrealistic discipline. It is more efficient for the captain and mate to be on the alert aboard the boat in the unlikely event that a problem should occur and a chase boat or in-water assistance can be rendered. For those wishing a more personalized diving service, there are stores and boat operations which will cater to no more than six people. Most of the larger operations will have divemasters on staff to lead dives or conduct introductory scuba experiences. If an individualized dive is required, the diver should make arrangements beforehand.

There are sophisticated specialty services available throughout the Keys. There are underwater photo specialists with daily E-6 processing and camera rentals, underwater video rentals and photographic services, rentals of diver propulsion vehicles and even an underwater habitat for aquanaut training. If it has to do with diving, it is probably available somewhere in the Florida Keys. The following section will deal with the unique attractions of the Upper, Middle and the Lower Keys.

UPPER KEYS

Key Largo, Tavernier and Islamorada form the centers of population of the Upper Keys and it is in this area that the heaviest concentration of dive operations is found. North of Key Largo, at the Ocean Reef Club, there is another quality dive operation, but this store primarily caters to the residents of this exclusive, members only complex. The stores clustered around the Key Largo and Tavernier area tend to dive John Pennekamp Coral Reef State Park, while those nearer Islamorada will dive the park on occasion, but also visit high quality dive sites closer to home.

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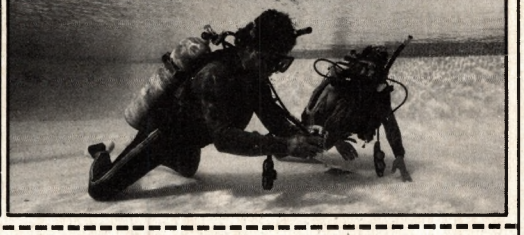
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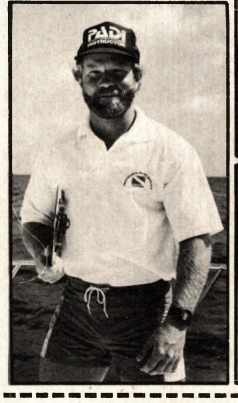






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Florida Keys

limit, is designated as John Pennekamp Coral Reef State Park. The area from the three mile limit to the edge of the continental shelf, six to seven miles offshore, is known as the Key Largo National Marine Sanctuary and is governed by federal statutes. The north-south boundaries of this marine preserve extend nearly 20 miles and contain a protected area of 188 square miles where it is illegal to spearfish, collect shells or corals, or in any way damage the corals. It is OK to take lobster of legal size during the season and line fishing is permitted, but it is illegal to even possess a speargun in the park.

There are more than 30 charter boats and 12 retail dive stores to cater to the divers and snorkelers drawn by the lure of this magnificent, protected marine environment. More than 500,000 paid admissions came through the gate of the state concession last year and perhaps twice that number were served by the other independent dive operators. More than 1.5 million divers, snorkelers, fishermen and glassbottom boat riders used this resource in the past year, making John Pennekamp Coral Reef State Park one of the premier natural attractions in the United States.

To protect the pristine nature of this reef structure, both commercial and pleasure craft must be very careful where anchors are dropped. At present there are 40 mooring buoys on Molasses, French, The Elbow, Carysfort and Dry Rocks reefs and the Department of Natural Resources plans to double that number. The Upper Keys dive operators are also very actively seeking to acquire a derelict vessel to sink as an artificial reef both north and south of the park boundaries. This would serve the dual function of creating an exciting new dive site as well as reduce traffic to the more fragile coral sites being impacted by diver pressure.

In seeking to tour all of Pennekamp, it is important to appreciate the sheer size of the park. Also, it is impractical for a dive operator located at the north end of the park to travel to the reefs at the south end on a half day trip, just as it is impractical for the operators at the south end to venture north. They may do so on occasion, but the majority of diving for any store will be done on the reefs closest to home. There is excellent diving throughout the park. In the following paragraphs I'll describe the better known of the Pennekamp reefs.

At the northern boundary of the park and marked by a huge 125 foot steel tower is **Carysfort Reef**. Named for the British vessel HMS *Carysfort*, which grounded on the reef in 1770, Carysfort is sometimes described as having a double reef configuration with a heavy concentration of elkhorn, staghorn, brain and star corals in the shallows near the light, but as the depth increases these tend to thin out. A sandy bottom with an occasional sponge and soft corals occurs at about 35 feet; then there is a fairly precipitous drop down to about 65 feet. Here there is a large staghorn colony, as well as lettuce corals. A sand channel perhaps 100 feet wide separates this reef from a second that rises to about 35 feet before sloping off on the seaward side. Exceptionally large pufferfish are found in this area as well as porkfish, schooling

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Marker 88—Mile Marker 88, Plantation Key, 852-5503. Local seafood, continental cuisine. Major credit cards accepted.

Eric's Floating Restaurant—Houseboat at Mile Marker 85.5, 664-9141. Fresh seafood, choice meats. Major credit cards accepted.

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Conch Restaurant—Mile Marker 83, Islamorada, 664-4590. Reservations required. Fresh seafood, beef, veal. Specialties include conch fritters, oysters Moscow and lobster de jonghe. Major credit cards accepted.

grunts, angelfish and sporadic visit of a pelagic such as an eagle ray or turtle.

The Elbow is so named because the reef juts out like an arm bent at the elbow. There are are several wrecks scattered throughout. Rarely exceeding 25 feet in depth, the reefs and wrecks of the The Elbow are especially popular for both divers and snorkelers. The dive operators in this area have been hand feeding barracuda and moray eels for years and these animals are quite tame and willing photographic subjects. On the wreck of the ***City of Washington*** one day last winter I remember chumming the area with ballyhoo. Within ten minutes there was a green moray, a spotted moray, an ocean triggerfish, a barracuda and some Bermuda chub all competing with the everpresent yellowtail for the handout. Just to the north of the tower marking The Elbow is another very interesting older wreck of wooden beams connected by iron pins. Referred to as the **Civil War Wreck**, it is inappropriate for more than six or eight divers at a time, but there are large schools of fish, interesting crustaceans, eels and lots of juvenile species seeking refuge among its decomposing remains. There is excellent photographic potential on this wreck.

Perhaps the best known feature of Pennekamp Park is not a reef at all, but the statue known as **Christ of the Abyss**. The nine foot tall bronze statue was cast in Italy and donated to the Underwater Society of America by Egidi Cressi, a diving equipment manufacturer. The statue was then set on the east side of the reef known as Key Largo Dry Rocks in about 25 feet of water. The tops of the outstretched arms are within ten feet of the surface and snorkelers frequently dive down to touch the statue. There are stands of elkhorn and brain coral in the reefs surrounding the statue, as well as a nice stand of pillar coral.

The ***Benwood*** is presently the most extensive shipwreck in Pennekamp Park. Originally torpedoed by a German submarine during World War II and then rammed by another boat as she limped back to port, the *Benwood* ran aground in waters ranging from 25 to 45 feet deep. The ship's superstructure was blown away as a hazard to navigation but the remaining 300 foot hull and scattered wreckage provides a home for large schools of goatfish, grunts and porkfish, as well as moray eels, grouper, copper sweepers and for at least part of the year, huge schools of glassy minnows. The macro subjects adorning the sides of the wreck are of special interest to the underwater photographer and the jawfish that nest in the sand near the wreck are fascinating, if elusive subjects.

Grecian Rocks is most appropriate for snorkelers and most of the boats specializing in snorkel excursions will visit the area. There are elkhorn and staghorn corals that stretch in impressive marine

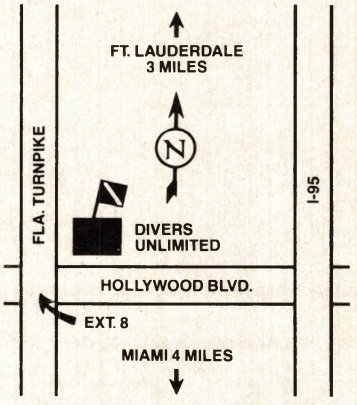


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forests and large star coral heads nearly break the surface. This is a good area to view juvenile and intermediate species of the more common Caribbean tropicals and there may be shells in the sand near the turtle grasses (although shell collecting is forbidden within the park).

French Reef is best characterized by its swim-through caves and large stands of elkhorn coral. The caves generally have openings three to four feet high, carved out of limestone rock and are not always readily apparent if you don't know where to look. The mooring buoy system on French is a guide as there are interesting caves or undercuts near each of the buoys. In addition to the copper sweepers in the caves, French also has several resident green and spotted morays, Nassau, black and marbled grouper, porkfish, yellowtail and snapper.

Molasses is among the best known reefs in the Florida Keys, partially owing to the 50 foot steel tower marking the shallows, but mostly because of the spectacular coral structures and bountiful marine life inhabiting its spur and groove formations. Molasses was thrust into the national consciousness earlier this year when the freighter *Wellwood* ran aground and caused severe, but fortunately localized, damage to a portion of it. That small area of the very large total reef is now restricted to divers as scientists experiment with coral regeneration programs and track the ability of that reef area to survive the trauma. The majority of the reef is as it always was prior to the grounding; beautiful high profile corals, with massive schools of grunt and snapper, an ancient windlass from an old sailing vessel, an encrusted Spanish anchor, inquisitive angelfish, moray eels and groups of four to seven scrawled filefish willing to gently take turns feeding from the diver's hand.

Just off Molasses, in about 55 feet of water, is a recent wreck of a 50 foot sailing vessel. While this site would not satisfy a group of divers for long, since there is little of interest in the bottom nearby, it is beginning to attract schooling fish and grouper. Some of the dive operators are also offering drift dives in 60 to 80 feet of water off the deep end of Molasses or a deep dive off Carysfort or the *Benwood* to provide some variety to the typical Pennekamp dive profile.

The fine diving in the Upper Keys is not confined to the park, however. There are very professional dive operations in both Tavernier and Islamorada, servicing a whole range of interesting dive sites including deep and shallow reefs, wrecks, drift dives and even an interesting artificial reef comprised of discarded bridge rubble. Since the diving outside the park is not restricted, it is possible to spearfish or collect shells, however, coral collection is illegal and absolutely prohibited.

Pickles Reef is just two miles southwest of Molasses Reef in 10-25 feet of water. Within these shallow waters are ample photographic subjects including flamingo tongue cowries, nudibranchs, pufferfish, spotted drums, juvenile and adult angelfish and barracuda. The grass flats on the back side of Pickles are common grazing grounds for the queen conch and occasionally the dive boats will take charters to this area to collect conch for a post dive party.

Another of the shallow reefs, in this case only three miles from the shoreline, is **Hens and Chickens**. Comprised of a collection of high profile star coral heads rising from a depth of 25 feet to within seven feet of the surface, Hens and Chickens is densely adorned with soft corals and seafans, encrusting sponges and the remains of an old steel wreck. Snook and Atlantic spadefish are often seen among the coral crannies of this reef, as well as the more common and colorful Caribbean reef tropicals.

Conch Reef has a shallow area stretching about a mile along the outer reef line with depths in the 35 foot range. It is typified by spur and groove coral formations interspersed by barrel sponges and especially large seafans and exciting fish populations. However, it is the adjacent **Conch Wall** that is perhaps the more impressive. Dropping from 60 feet to 105 feet at about a 70 degree angle, the Conch Wall is rich with large barrel sponges and gorgonians that feed on the plankton borne along in the steady currents. Eagle rays, turtles and an occasional shark are often sighted here, as well as the queen and blue angelfish, triggerfish, grouper and other tropicals comprising the daily resident population. Many of the boats work the Conch Wall as a drift dive to maximize the amount of territory available.

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Crocker Reef is another popular dive site for boats operating out of the Tavernier or Islamorada area. The boats often anchor in about 55 feet of water above a sort of coral cliff. The top of the reef consists of spur and groove coral with the sandy trenches running parallel to the reef line and gently sloping from a depth of 35 to 50 feet. From this point the reef drops almost vertically to 80 feet, providing interesting relief for wide angle photos, especially with the large barrel sponges, seafans and deep water gorgonians to provide color accents. It is not unusual to see turtles, grouper, spotted eagle rays, hogfish and schools of mutton snapper populating this impressive dive site.

The **Cannabis Cruiser** is a favorite of wreck diving *aficionados*, sitting upright in the sand at 110 feet with its cargo of marijuana still in the holds and its hull and superstructure adorned by spiny oysters, decorator crabs and sponges. There are also schooling jacks, grouper and a resident jewfish that are willing photographic subjects. **The Gully**, nearby Alligator Light, is a fascinating second dive, shallow in depth and featuring magnificent schools of fish beneath the coral ledges.

In Islamorada the discarded sections of the **Snake Creek Bridge** were intentionally dumped in 105 feet of water in 1984. Already there are massive schools of snapper and grunt, lobster, porgies, angelfish, grouper and stingrays. It is sort of eerie to dive among the guard rails, concrete rubble and upright, two lane highway reaching toward the surface, but it is the abundant marine life that makes the dive truly exciting.

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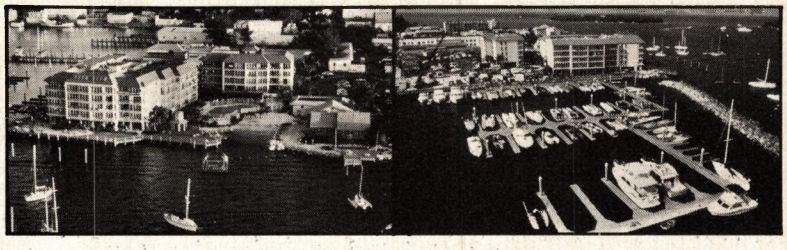
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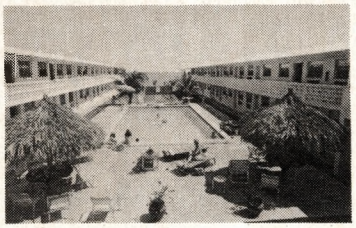


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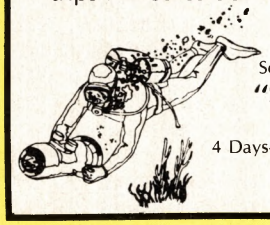
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Florida Keys

tures an air strip with daily commercial service from Miami, numerous motels and resorts, excellent restaurants and a number of very professional dive operations. The dive shops in Marathon, as in the Upper and Lower Keys, specialize in half-day dive charters to the reef, that tend to cater to a wider variety of interests than might be typical of shops in the Pennekamp area. In addition to general diving or U/W photography, spearfishing and shell collecting are popular and, of course, the whole range of instructional programs from resort courses to scuba instructor certifications are obtainable.

In addition to the dive centers clustered around the Marathon area, between MM 40 and 50, there is also a new professional dive concession operating out of the Hawk's Cay Resort north of the city at MM 61 and there are several shops in the Big Pine Key area around MM 30.

Near Marathon is the swingspan of the **Old Seven Mile Bridge**, which sits in 115 feet of water on a sand bottom, but rises to within 40 feet of the surface. Intentionally placed here, it makes a magnificent artificial reef. The swingspan had metal gears that are presently encrusted with all sorts of soft corals. The entire structure is rich with spiny oysters and sponges. The marine life is excellent as this rubble has been down for several years now. While the visibility is often marginal because of tidal flows from the bayside, when it is clear it is spectacular. And, even when it is stirred up and turbid, the marine life and potential for macro photography make it one of the very special Middle Keys dive sites.

The most heavily dived area offshore Marathon is **Sombrero Reef**. Marked by a 142 foot high navigational tower, with beacon, about five miles off the southwestern tip of Vaca Key, Sombrero Reef is easily accessible to pleasure craft unable to locate some of the other reefs. But ease of location is hardly the sole attraction, for dive operators intimate with the whole range of dive sites often choose Sombrero as one of their favorite shallow dives. Depths range from just a few inches below the surface at low tide to about 30 feet. The staghorn, elkhorn, pillar, brain and star corals that make up the reef grow in fingers pointing toward the surge of the open ocean. The dense marine life encountered here includes schools of goatfish and grunt, barracuda, jacks, trumpetfish, rays, etc. There are hundreds of cleaning stations in the Sombrero Reef area and these are excellent opportunities to get close to otherwise skittish fish.

Only one mile east of Sombrero is **Delta Shoals**, with a shallow reef at 25 feet. To the south, toward the open

ocean, the reef slopes off to more than 100 feet, with an older reef of hard corals, barrel sponges and gorgonians. Healthy populations of tropical fish may be found in both the shallow and deeper portions of the reef but the larger snapper and grouper so prized by the spearfishermen are generally found in the greater depths. In the shallows shoreward of the reef are great grassy flats that are home to the queen conch. Even farther toward the shore and Hawk Channel, in 35 to 45 feet of water, the larger helmet conch may be found.

North and slightly east of Delta Shoal and on the north side of Hawk Channel is **East Washerwoman Shoal**. While this shallow reef formation is a little too close to shore for consistently good visibility, the coral formations are superior and the populations of juvenile and mature tropicals are most impressive. A little more than five miles northeast of the East Washerwoman Shoal Light is an area known as **Coffins Patch**. In reality, it is a collection of six distinct reefs, each with its own dominant species of coral. The pillar coral of the area is perhaps the most impressive, sometimes rising eight to ten feet above the sandy ocean floor. It is apparent that in earlier times even taller specimens grew, for they are occasionally truncated and regenerating today, a testament to the wanton reef destruction that occurred before it became illegal to harvest corals. In the deeper waters that edge toward the Gulf Stream from Coffins Patch are scattered, but huge, high profile coral formations and basket sponges.

Marathon has perhaps 30 very fine dive sites visited with regularity by the local stores. One of the beauties of the area is that, except for Sombrero Reef, it is unlikely that another dive boat will be on the same reef. Crowds are lighter, diving activities more varied and service perhaps more personalized as compared with Pennekamp Park.

Looe Key is a long boat ride for dive shops based in the Marathon area, but when the conditions are ideal, the boats will sometimes take all day charters to this spectacular marine sanctuary. The dive stores in Big Pine Key feature much shorter boat runs to Looe Key and dive these reefs daily, making Big Pine Key the best base of operations for a Looe Key excursion.

The reef was named for the HMS *Looe*, a frigate run hard aground in 1744 on a small sandy key adjacent to the reef. The key has since been swept away by a hurricane. In 1951 a salvage expedition recovered most of the artifacts from the wreck. The remaining reef is a perfect example of the spur and groove reef system and is one of the most beautiful, varied and prolific reefs in all the Keys. Approximately 200 by 800 yards, the reef is basically Y-shaped with depths to 100 feet and the best of the diving occurring in 10

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Florida Keys

to 35 feet of water. Looe Key achieved sanctuary status as one of the final acts of the Carter administration. While diver traffic has increased substantially in the past five years, the protected status of the reef has generated even greater fish populations. Butterflyfish, hogfish, grouper, moray eels, damselfish, angelfish, turtles and rays now make their homes around Looe Key and the diving potential in the area is stunning.

LOWER KEYS

Key West is the primary draw for tourism in the Lower Keys and is a truly fascinating city. Steeped in historical significance, the Key West of today features some of the finest resorts, night clubs and restaurants of the Florida Keys. A Spanish explorer apparently found sun bleached animal skeletons littering the ground in the area and gave it the name of Cayo Hueso (Bone Island) and from this came the anglicized Key West. In 1822 the Spaniard who owned Key West sold it for $2,000 to John Simonton, who then sold three-quarters of his interests to John Whitehead, John Fleeming and Pardon Greene. These four built the first homes, shops and warehouses along the natural harbor (today's Front and Wall Streets). The first industry of those early days was wrecking, i.e. salvaging, rescuing people and cargoes from the ships run aground on the treacherous, unmarked and unlighted reefs. Though wrecking remained the main industry for many years and attracted settlers from the mainland, the Bahamas and Europe, the industry declined with the lighthouse construction program after the 1830s. Other early industries included salt making by evaporation of seawater, but that too collapsed after the Civil War owing to a lack of slave labor. Cigar making was an important industry for a time, as was fishing and the ship chandlery business. Sponging and pineapple growing and canning added to the local economy until Key West had the highest per capita income of any city in Florida.

The boom went bust after World War I as wrecking was finished, Hawaiian pineapples took over the market, a blight killed many of the sponges and labor troubles moved the cigar industry to Tampa. Shipping fell off because the ships now had refrigeration, radios and petroleum engines. The Great Depression removed much of the military and government presence and when the 1935 hurricane struck, wiping out the Overseas Railroad, Key West became dependent on the Federal Emergency Relief program and other such agencies.

With the completion of the Overseas Highway in 1938 and the freshwater pipeline in 1942, the stage was set for Key West's strongest economy ever, one based on tourism. To tour Key West today reveals no throwback to hard times. In fact the city is vibrant and exciting. The spring break college kids have discovered the quaint charms, uncrowded beaches and superior nightlife; and this year Key West is enjoying heavy family business. Diving is but one aspect of a total vacation package available with a Key West destination including shopping in unusual gift stores, touring historical landmarks with fascinating architecture, dining on outstanding local and seafood cuisine and enjoying a complete and varied nightlife.

Among the favorite Key West dive sites, **Sand Key** is certainly the most visible and frequently dived. Marked by a large conical lighthouse, Sand Key is comprised more of ground up coral and small shells than powdery sand and with every winter storm or hurricane the configuration changes slightly. The reef is typical of many of the shallow Lower Keys reefs, i.e. the spur and groove of rock or coral fingers alternating with sand gullies with depths from 5 to 25 feet. Some sections of the reef are predominantly staghorn and elkhorn coral, whereas fire coral abounds elsewhere. Visibility at Sand Key can depend on tides, wind and wave action, and can range from 20 to 100 feet, however, an average expectation is 30-40 feet.

Rock Key, **Eastern Dry Rocks** and **Western Dry Rocks** are all popular among the dive charter boats in the area with Rock Key and Eastern Dry Rocks adjacent to each other about one to one and one-half miles east of Sand Key. Western Dry Rocks is about three miles to the west of Sand Key. Each reef has its own personality, but Rock Key and Eastern Dry Rocks have a zone of coral nearly awash at low tide and long fingers alternating with sand gullies to seaward. It is common to see lobster, conch, seashells of several varieties and lots of tropical fish in the maximum 35 foot depths. And, in addition, there is the possibility of find-

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ing artifacts from several 19th century wrecks. Western Dry Rocks is also of the spur and groove configuration but will drift off to seaward in deeper water, the depth range being from about 5 to 120 feet along a gradual slope. There are numerous crevices and caves throughout the area and lobster, blackbar soldierfish, spotted drum, copper sweepers, moray eels and many of the species typically found hiding in coral recesses will be found here. Certain times of the year it may be possible to see sharks, large jacks, permit and huge grouper. On occasion the visibility here can be among the best in the Lower Keys.

There are three Sambo reefs, Eastern, Middle and Western and these are popular dive destinations. **Western Sambo** has the typical Keys shallow reef configuration of high profile hard corals with sea-fans, encrusting sponges and lots of tropical fish. It is further distinguished by the wreck of the ***Aquanaut*** sitting upright in 75 feet of water at the edge of the Gulf Stream. The *Aquanaut* was the former workboat of local commercial salvor Chet Alexander, sunk intentionally as an artificial reef. Now it has attracted schools of mahogany snapper, bigeyes, goatfish, angelfish and plenty of macro subjects coat the hull. The wreck is wooden, however, and has steadily deteriorated over the years.

Eastern Sambo is characterized by small coral heads and ledges and is one of the more popular destinations at the start of lobster season. **Middle Sambo** has the more defined reef structure around 30 feet and then from 30-60 feet is a fairly precipitous drop-off to seaward. The **Ten Fathom Ledge** is nearby and is a common site to find grouper or the occasional shark.

Another ship sunk by Chet Alexander bears his name, the ***Alexander***, and sits in two sections in the Gulf of Mexico near the entrance to Northwest Channel. Parts of the wreck are awash and the maximum depth for any of the wreck is only 30 feet. It is home to tremendous quantities of fish. It is not dived often, though, because visibility is often poor and will average only 25 to 30 feet. However, when the weather is kicked up on the Atlantic side, the wreck of the *Alexander* can be a very productive alternative. The hull is adorned with various macro subjects. Atlantic spadefish, porkfish, grouper, hogfish, angelfish and various snappers are the regular residents.

Consider the above merely a small sampling of the excellent diving available in the Florida Keys. The Keys are a serious diver's destination, but you don't have to be a serious diver to enjoy them. There is fine dining, fishing, beachcombing, boardsailing, sailing, mangrove exploration, shopping and plenty of places to just bask in the warm tropical sun.

LOWER KEYS RESTAURANTS

Baltimore Oyster House—U.S. 1, Mile Marker 30, oceanside, Big Pine Key, 872-2314. Fresh seafoods, choice meats, raw bar. Major credit cards accepted.

Pier House Restaurant—Duval Street, Key West, 294-9541. Continental and American specialties, Sunday champagne brunch. Extensive wine list. Major credit cards accepted.

Capt. Hornblower's Jazz Club—300 Front Street, Key West, 294-4922. Native Key West cooking. Live entertainment nightly in the upstairs dining room. Visa cards accepted.

Bagatelle—115 Duval Street, Key West, 294-7195. Caribbean cuisine with local seafoods and tropical fruits. Major credit cards accepted.

Kyushu Japanese—921 Truman Avenue, Key West, 294-2995. Sushi bar, entrees with rice and salad. Reservations recommended.

The Buttery—1208 Simonton Street, Key West, 294-7195. Gourmet cuisine, fresh seafood, vegetarian fare, beef. Major credit cards accepted.

Gringo's Cantina—509½ Duval Street, Key West, 294-9215. Mexican food, frozen margaritas. Major credit cards accepted.

Sugarloaf Lodge and Lounge—U.S. 1, Mile Marker 17, Sugar Loaf Key, 745-3741. Dolphin shows at 9:00 am, 1:00 and 5:00 pm. Fresh seafood, beef. Major credit cards accepted.

Whale Harbor—Mile Marker 84, Islamorada (on the oceanside), 664-4959. Buffet and seafood. Major credit cards accepted.

Green Turtle Inn—U.S. 1 at Mile Marker 81, 664-9031. Broiled steaks, chops, native seafoods. No reservations. Closed Mondays. Major credit cards accepted.

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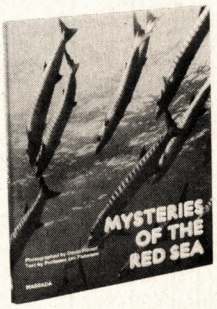
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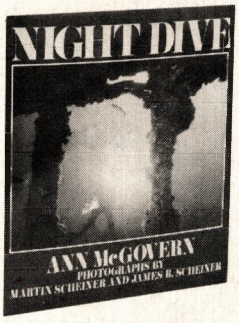
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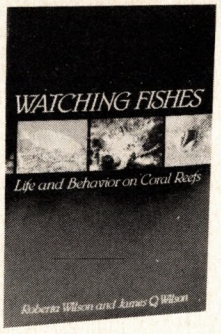
Mysteries of the Red Sea—With text by Professor Lev Fishelson, this book features the photography of David Pilosof illustrating the animals of this area. Includes a background on the Red Sea. $29.95. From Sheridan House, Inc., 145 Palisade St., Dobbs Ferry, NY 10522.



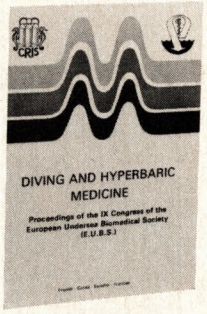
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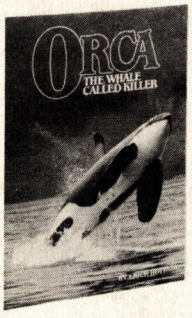
Artificial Reefs & Wrecks: Broward County—By David B. Turbeville, this book describes the locations of artificial reefs, including photos of the shoreline. $5.95 ($1 is for the Broward Co. Artificial Reef Program). Inst. of Marine Sci., 1428 S.W. 12th Ave., Pompano Beach, FL 33060.



Watching Fishes—By Roberta and James Q. Wilson, this book explains why the reef animals behave as they do. With illustrations and photos, it is divided into chapters on swimming, predation, reproduction and other topics. $25. Harper and Row, 10 East 53rd St., New York. NY 10022.



Diving and Hyperbaric Medicine—This book contains the Proceedings of the IX Congress of the European Undersea Biomedical Society. 5,500 pesetas (includes air mail postage). Unitat de Terapeutica Hiperbarica, Hospital de la Creu Roja, Dos de Maig, 301, 08025 Barcelona, Spain.



Orca: The Whale Called Killer—W many photos, this revised edition by Eric Hoyt is an account of seven summers spent studying these animals in the waters off northern Vancouver Is. $12.95. Firefly Books, Ltd., 3520 Pharmacy Ave., Unit 1-C, Scarborough, Ontario M1W 2T8.



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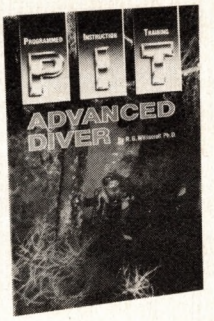
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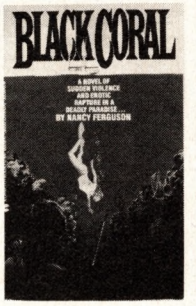
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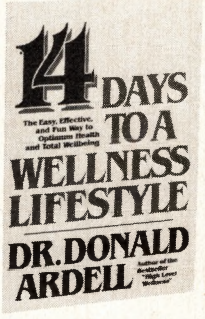
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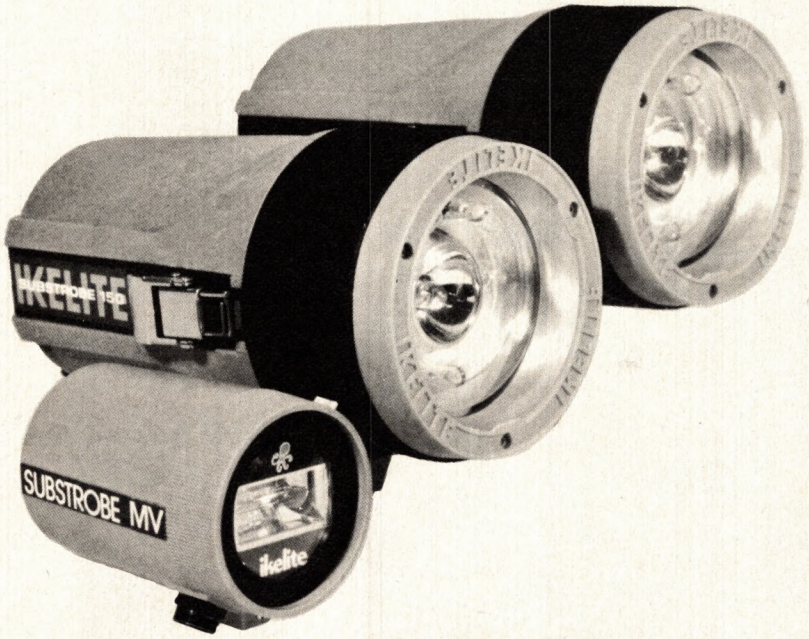


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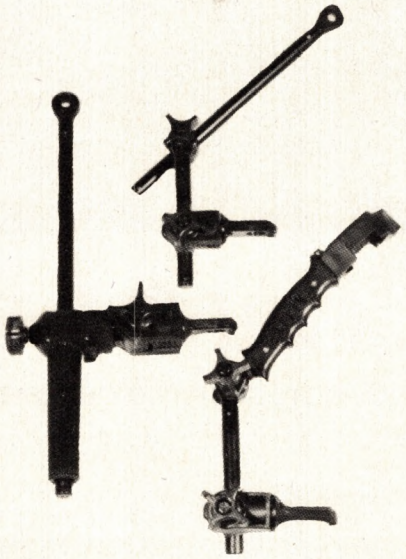
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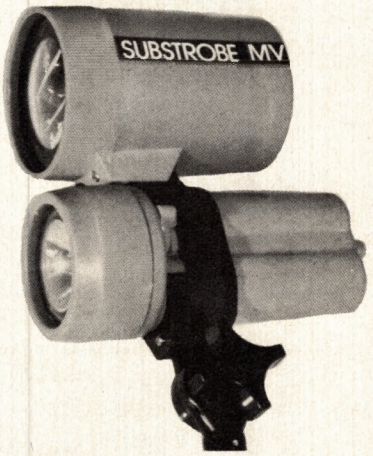


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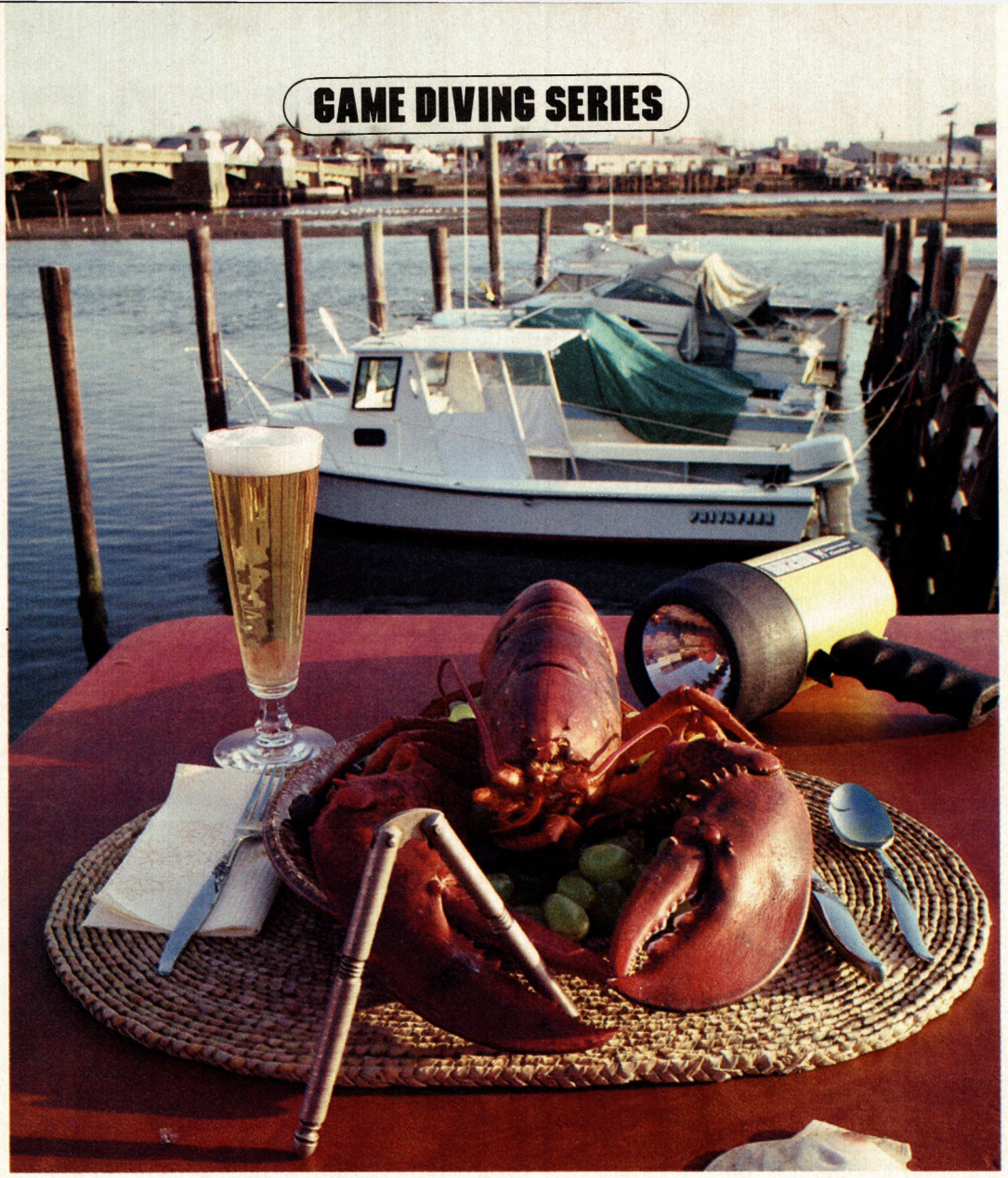
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East Coast Lobster

TEXT AND PHOTOGRAPHY BY HERB SEGARS

The southern section of the United States may have clear water and coral reefs; the West Coast may have kelp forests and sea lions; but the East Coast, from Maine to North Carolina, has its own undersea celebrity, the North American lobster (*Homarus americanus*). This clawed crustacean has been the unwilling guest of honor at more seafood dinner parties than almost any other species of underwater life. Yet, very few people know how the lobster lives, what it eats, or how it survives in the undersea community.

During the daylight hours, lobsters are found in their usual positions, facing the entrance to their lairs with claws at the ready and antennae swaying to and fro like an underwater radar detection system. They seem to retreat at the slightest movement by a diver. Why do they react so quickly? Is it keen eyesight that warns the crustacean?

A lobster has an eye that is very similar to that of a fly. It is compound, made up of thousands of tiny facets or little eyes, which are extremely sensitive to light, as evidenced by the lobster's nocturnal roaming habits. Although very sensitive, sight seems to be the lobster's poorest sense. To compensate for this, Mother Nature has bestowed on the crustacean other sensory devices to alert it to impending danger.

These functions are similar to smell, hearing and touch, and are honed to a high degree of sensitivity. Now, we all know a lobster has no ears, so how can it hear? On nearly every part of the lobster's body are tiny hairs that sense movement in the water and transmit the data to the lobster's nervous system, much the same way the human ear senses sound waves in the air stream. This same sensory system is used in orientation and navigation. Hairs on the tips of its legs provide the lobster with information about the terrain it is traversing. In many ways, the lobster operates as a blind person would, feeling its way over and around many irregularities on the ocean bottom. While hearing and touch are recorded by the tiny, bristle-like hairs,







Top to bottom: Ruth Nichols exits the water with her goodie bag full of lobster. Steve Nagiewicz displays his catch. A good day's harvest of *Homarus americanus*. Opposite page: A lobster dinner set out at Shark River in Avon, New Jersey. The East Coast lobster is a highly prized delicacy and its price in restaurants represents this. Knowledgeable divers, however, can get their own lobster dinner for free while enjoying their favorite pastime.

the lobster's keenest sense is that of smell. It accomplishes this through tiny chemical receptors on various parts of its body. Remaining down current, the lobster samples the water for scents of enemies or possible food sources, reacting quickly to information. Lobsters can even communicate with each other by releasing chemicals into the water.

The lobster diver is usually equipped with a powerful underwater light to scan dark holes and crevices. This must be done very carefully as too much light entering the lobster's hole will be recorded by the light sensitive eyes and it will back deeper into its lair, out of the diver's reach. Once the lobster is found, the diver must plunge his/her hand blindly into the hole and grab hold of the crustacean. The claws must be pinned down before they can exert their powerful crushing pressure on the hand. The trapped lobster must then be extracted. The lobster retreats with amazing speed.

Those lobsters unfortunate enough to be grabbed by a diver have another life saving ploy that can be utilized. At the tip of the lobster's head is an appendage called a horn or beak. When the lobster fears that it will be dragged from its home, it arches its back and lodges the horn into the roof of the hole. The animal can become almost impossible to remove without using both hands or pushing the head down. Sound simple? The majority of the time, a diver is working in a hole barely larger than his/her arm and the hand of that arm is usually an inviting target for the large crusher claw of the lobster. Muffled screams escaping from broken air bubbles on the surface have signaled topside observers that man has once again met his match. Many lobsters have regained their freedom during one of these indelicate maneuvers.

If all other means of escape prove futile, the tenacious crustacean relies on its ace in the hole, locomotion. Unfortunately for the lobster, this means of escape only works with novice hunters. A lobster can move through the water with amazing speed by flexing its abdominal muscles and snapping the end of its tail underneath its body. This snapping motion, combined with the shape of the lobster's tail, moves it backward through the water rapidly. A number of novice hunters have attempted to put lobsters into mesh bags claws first and have stared in amazement as the animal propelled itself backward out of the bag and into the depths.

Another interesting weapon in the lobster's diverse arsenal is an unusual ability for it to shed a claw at will. This occurs near the second or double joint, where the claw is the smallest. This can be done during molting when the lobster has difficulty withdrawing from the claw and can also be done when threatened by an enemy. Fear not for the poor lobster, for within three molts the claw will have been regenerated to its formidable former self.

Distinction between the male and female lobster is an easy task accomplished by turning the crustacean over and looking at the first set of swimmerettes on the tail. These appendages are found directly to the rear of the last set of walking legs. On the female, the swimmerettes are soft and feathery while the male displays hard and bony projections.

The lobster's diet consists of clams, mussels, snails, marine worms, some seaweed, starfish and fish when they can be captured. One of the favorite meals of the lobster is the rock crab (*Cancer irroratus*). This crab is a feisty little fellow who will rear up and defend itself. This fighting position, although brave, provides the lobster with many flaying appendages to grasp. A close relative of the rock crab, the Jonah crab (*Cancer borealis*) is not favored by the lobster because when threatened, the crab will tuck in its appendages and settle into the bottom, giving the lobster very little to hold onto.

Besides codfish, man is the major predator of lobsters. The current lobster laws in most Northeastern states require that a lobster be at least three and three sixteenths inches in length from the end of the eye socket to the beginning of the tail before it can be kept. Studies show female lobsters are not ripe for mating until they reach a length of three and three-quarter inches. This may be the cause for the decrease in average size of commercially caught lobsters over the last few decades. More laws are being introduced each year to control the number and size of lobsters that can be taken. Sport divers can do their part in lobster preservation by not taking shorts and by immediately returning egg-bearing females to the site from which they were taken.

There is nothing quite like the adrenalin that pumps through the body during the hunt for the clawed crustacean and there is no comparison in the taste between freshly caught and store bought lobster.



photo/courtesy Mariners' Museum

The Mystery Of The

STEAMSHIP OREGON

Was She Sunk By A Phantom Schooner?

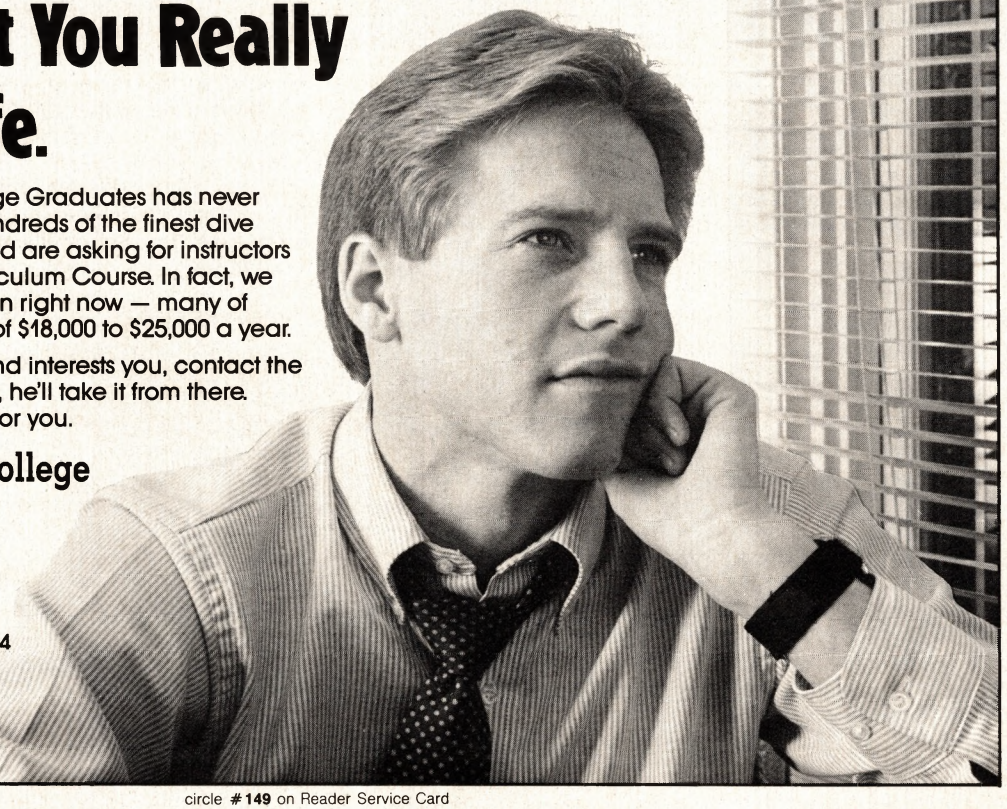
BY JEFFREY KASSNER

Just before daylight on March 14, 1886 the Cunard liner *Oregon*, bound for New York City from Liverpool, England was some 70 miles east of her destination. The weather was clear, but off in the fading darkness a schooner was on a collision course with the 520 foot long steamship. At 4:30 am the unseen schooner struck the *Oregon* amidship, ripping a large hole in her side. Eight hours later the vessel was on the bottom in 120 feet of water, about 15 miles south of Moriches Inlet, Long Island.

Even though shipwrecks were relatively commonplace in the 19th century, the sinking of the *Oregon* received special attention. First, she was well known for her size, luxury and speed. Second, the circumstances surrounding her loss, particularly the identity of the "phantom schooner" aroused interest.

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Even though she displaced over 7,000 tons, she was capable of nearly 19 knots and set a record for the shortest transatlantic crossing. Launched in 1883, she was purchased the next year by the Cunard Line when Guion went bankrupt.

Although there were many conflicting accounts of the sinking, it was generally accepted that the *Oregon* was rammed by a schooner. One of the passengers said she saw a red light and what she thought to be a sail through her cabin window. Several officers reported the sudden appearance of a bright light that disappeared only to reappear at the time of the collision. It was therefore surmised that, even though the evening was clear, the schooner was unseen because she approached the *Oregon* nearly head-on with head sails obscuring the starboard lights. That the *Oregon* was struck by another ship was supported by divers, sent down a month after the sinking. They reported scratches, as if made by the fluke of an anchor, stretching the length of the *Oregon* aft the hole in her port side.

The schooner was not seen after the collision and there was no wreckage. The force of the collision (the *Oregon* was steaming at 18 knots) no doubt sent the schooner quickly to the bottom. Its identity has never been established, although the schooner *Charles Morse* was reported missing that night.

Shortly after the collision, a heavy canvas was thrown over the hole in the *Oregon's* side to stop the inrushing water. The attempt failed, dooming the *Oregon*—even though the liner had watertight doors, the breach occurred through her largest compartment, which could simply hold too much water. Accordingly, Captain Coltier, commander of the *Oregon*, had his ship's course changed so as to ground her on Fire Island. Before much progress could be made, however, the boilers flooded.

The *Oregon* sank so slowly that before the passengers had to abandon ship they were served coffee and tea and had plenty of time to dress for the 32°F chill. A pilot boat and a schooner arrived shortly after the *Oregon* began sending up distress rockets. Seventeen hundred passengers and crew were first transferred to these two boats and then to the German ship *Fulda*. No deaths were reported.

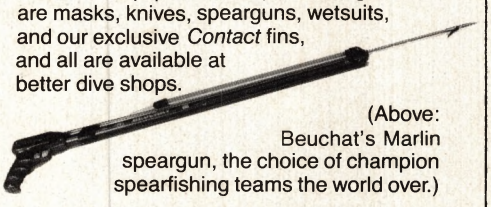
In 1893 it was reported that an attempt was going to be made to raise the *Oregon*. Rubber bags were to be placed inside the hull and then pumped full of air. If the plan was carried out, it was unsuccessful, for today the *Oregon* is one of Long Island's premier wreck dives. Although the diamonds she carried were removed before she sank, over the years, the *Oregon* has yielded a variety of artifacts, most notably fine china stamped with the Cunard label. Many interesting items remain to be found. In any case, diving the *Oregon* is an experience few ever forget.



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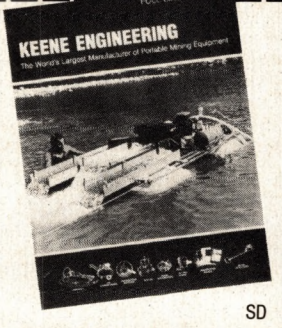
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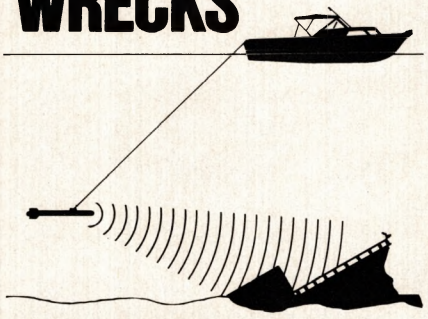
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RESCUE!

Drama and High Adventure in Hood Canal

BY MICHAEL K. BALLINGER

It was a normal day at Keyport Naval Torpedo Station, Keyport, Washington, where I worked with 12 other Navy divers. Our main job was the recovery of torpedoes fired on the base testing ranges. It was late in the afternoon and I was trying to think of a way to convince John Lankford, the master diver and my boss, to let me off early to do something like cut my grass or wax my truck. Then the phone rang.

The caller reported that a ferry boat on the Hood Canal had turned over and our help was needed to rescue people still trapped inside. The word spread quickly. All the Keyport divers heard John say we would need our commanding officer's authorization to get involved. He told us he didn't have all of the facts yet and directed us to start packing for the worst. Each diver grabbed his own flight bag—always packed and ready for emergencies. These contain all the equipment needed for scuba diving except the tank. The diving locker held two trucks that were loaded with tanks, gear, ropes, underwater lights, air compressors and hundreds of feet of diver's air hose. This latter was taken just in case we could pump air into the spaces where people might be trapped.

All of this was completed in the five minutes it took to get the word back from our commanding officer to go. Another call provided us with more information. The overturned craft wasn't a ferry but, instead, a large tug that had been pushing a car barge. We were asked to wait until a highway patrol car came to lead us to the scene.

The Navy vehicle we were using at the time was a large van and the highway patrol kept leaving us far behind. At every traffic light we would find our escort waiting, lights flashing.

It was about ten miles to the ferry landing and as our driver tried to set speed records the nine of us tried to get into our wetsuits in the back of the bouncing van.

As we piled out of the van at the ferry landing we could see the bottom of the tug drifting out toward the center of the canal. The main propeller shaft was broken and the large propeller missing.

Because the tug was so far from shore, most of our gear and all of the air hose were completely useless. Each man grabbed his own bag, a set of scuba tanks and headed for the water. At the ferry landing there were several small boats that had come up the canal from the Bangor submarine base. We quickly loaded our gear into the closest boat and headed toward the overturned tug.

As we arrived alongside, John took reports from a man who had seen the tug roll over when struck by the large, 100 car barge it was pushing. He said there was someone trapped inside and he had been exchanging tap signals with the person through the hull. John then talked to a civilian diver who reported he had been aboard a tug identical to this one and knew how to get to the trapped man. The last report came from a member of the tug crew who had jumped clear as the tug rolled over. He told us that there were two missing men.

Everything began to happen very quickly then. John turned to me and simply said "get suited up." I entered the water and swam over to my partner, the civilian diver who had said he knew how to reach the trapped man. I was very unhappy about diving on any job as potentially dangerous as this one with a partner I knew nothing about. However, the man turned out to be Carl Sheats, a diver I knew to be very experienced.

Carl told me that the best way in should be through the side door of the tug. We signaled John we were going down, so he could start our time. He gave us the OK and we headed for the door. Visibility wasn't very good. We found the door easily but couldn't get it to open. It must have jammed or locked on the inside. We headed back to the surface where we told John that way was no good and we would next try the door behind the large towing winch on the tug's stern. John gave us a line to take down and use as a guide to find our way back out.

It proved to be a very tight squeeze behind the winch to get to the door but Carl got in and managed to open the door. We now realized there was no way we could swim the safety line through the tight spaces, since we were already totally tangled up and not even inside yet.

Back on the surface we reported to John that we didn't want to use the line and picked up some extra gear. We took two underwater lights, which Carl would carry since he was leading the way. I would carry a spare scuba tank and regulator to strap onto whoever we found inside the engine room, our destination.

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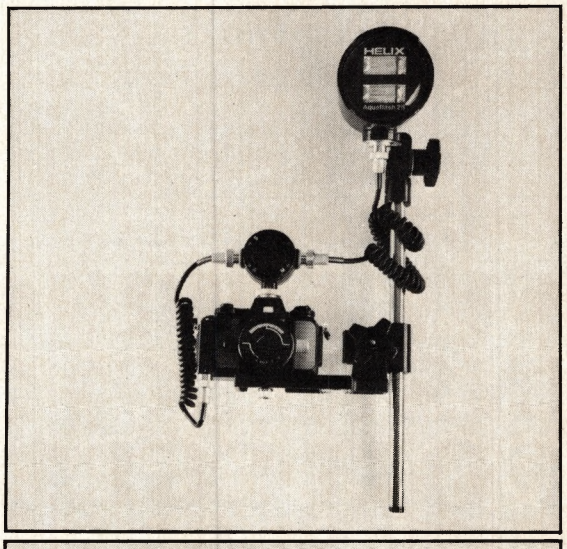
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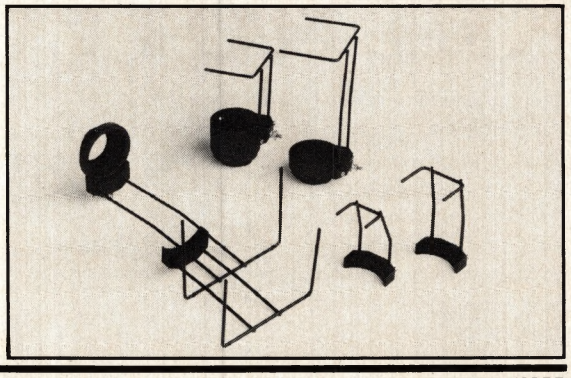
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TUG RESCUE

As soon as Carl entered the galley through the after hatch the lights he was carrying flashed across the face of one of the missing crew. The man was floating upright, dead. I immediately gave Carl what I figured was a standard Navy signal in this case by grabbing his leg and giving him a good shake. Carl turned to see what I wanted and I pointed toward the body. Carl shook his head yes and turned to swim into the galley, right past the body. He was one really cool man, I thought to myself.

It was very hard to swim through the inside of the tug because it was dark and there was junk floating everywhere. It felt strange to see the tables on the "ceiling" and the overhead lights on the "floor."

We moved through the tug pushing canned goods, wires and fallen paneling out of our way. As I didn't have a light, I stayed so close to Carl that the tips of his fins kept hitting me in the face. As we left the galley the passageway we went down was so narrow we could just barely fit through it with all our gear on.

Carl turned and pulled himself *up* a very small passageway that used to lead *down* to the engine room. I was now starting to feel very closed in and with each turn or doorway we passed I made a mental note of just where I was at all times, knowing my memory was going to be my only safety line out of there.

I followed Carl up into the air pocket that was the bilge of the engine room. As my head came up into the air the first thing I realized was I couldn't see very well. As I removed my mask I found it was covered with a thick coating of oil.

Carl had pulled himself up into the space to make room for me to get my head up into the small air pocket. I kept my legs in the passageway just in case we had to get out in a hurry. Carl later told me that when he first came up into the air pocket with the dive lights in front of him the lone surviving crew member, who had been in total darkness, shouted "What the hell is that?" Carl answered by introducing himself.

The trapped man, Scotty, said when he first saw the lights he thought the tug was on fire. He had been screaming to the people on the outside not to cut through the hull with a torch because the air inside was thick with fuel fumes. He said that at this point all he needed to round out his day was a good fire.

Carl and I were making small talk with Scotty to keep us all calm while we organized for the trip out. The first thing Carl asked Scotty was "where is your friend?" Then I knew why Carl had been so cool back in the galley with the body—he hadn't seen it! I knew this was not the time to tell Scotty that the other crew

member had died, closer to the outside than he was right now.

We told Scotty that we had come to take him out of the tug but he said he would rather wait for some other way. We soon found out that Scotty couldn't swim. We told him that he would not have to swim, just breathe.

As we talked we strapped Scotty into the spare diving gear and explained how everything worked. As we tried out the equipment we ran into our first problem; Scotty had no teeth! He would need his teeth to hold the regulator in his mouth. I told Scotty to just use both of his hands to hold the regulator in. I told him I would hold onto him firmly so he would always know I was with him. I told him that it was very important to let me do all of the work as we moved through the tug and to never reach out and grab anything. I was afraid he might panic and latch onto something I wouldn't be able to get him away from.

I backed down into the passageway to wait for Scotty. When I was in the right position I reached up and gave his leg a hard squeeze. Twice his legs came down to me but both times he kicked away and went back up into the air space with Carl. I waited below, knowing that Carl was trying to calm Scotty down enough to try one more time.

Suddenly I was in total darkness. My light had gone out! I tried to fix it by banging it against the wall, with no results. Just as I was saying to myself, "What next?" My regulator began to freeflow. It was freeflowing so badly it was completely blown out of my mouth. I quickly reached back to where the regulator was connected to my tank and followed the hose back to the mouthpiece. With one hand I held the mouthpiece in place as I reached over my head, hoping that if I turned off the air and turned it back on again my regulator would reseat itself. It didn't work so I opened my tank valve just enough to let a little air through.

Things were definitely not going according to plan. I had to get back up into the air space myself. But now Scotty had his legs in my way. I just pushed my way up, with Scotty sitting on top of me.

Once back up inside I told Carl that things weren't going very well and that I was going to go back out to get a new regulator and light before we could proceed farther. I also realized that Scotty was having such a hard time because we hadn't brought in a facemask for him. Diving without a facemask is very simple for the experienced diver but very hard for the beginner. Scotty kept getting water up his nose and that is what kept him kicking away from me.

After leaving the last working dive light with Carl and Scotty I dropped back down into the passageway and started moving aft. I felt my way along trying to remember every turn and doorway until I worked my way back to the galley. Once



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there I could see the light from the after door. I could also see the body of the other crewman right where I had left him. I thought about taking him out and up with me but I wasn't sure I could squeeze him past the winch and I didn't want to waste any time getting the new gear and getting back to Carl.

Outside, as I hung on the side of the boat, John changed the regulator on my tanks and gave me a new dive light and facemask for Scotty.

Going back in the tug was much harder than the first time. I knew that once again the body would be by the door as I entered the after hatch.

I had forgotten about the oil in the water when I hooked the extra facemask on my arm for Scotty. Back in the engine room we found it was covered with oil. We did the best we could to clean it up so it wouldn't slide right off Scotty's face. We couldn't get it clean so Carl took the spare mask and gave his to Scotty.

Time was definitely running out on us. The cold water was starting to have bad effects on Scotty and soon he might lose consciousness. Once again I backed down into the passageway to wait for Scotty, but something was very wrong. I was hung up on something and couldn't get all the way down. I kept moving back up into the passage and back down but no matter what I did I couldn't free myself. I became aware that if Scotty should come down now, before my signal to him, we would be in serious trouble. I discovered that I was caught by the pressure gauge of my scuba tank. I freed myself and tucked the gauge under my belt, to keep that problem from recurring.

As soon as Scotty came down to me I knew that there wasn't enough room in the passageway for all three of us, so I grabbed him by the arm and started pulling him aft toward the galley. I couldn't see very well because of the oil in my eyes and the poor light but it seemed that each time I reached out to grab at something to pull us along I always found what I needed.

As we entered the galley I turned off my dive light, hoping that Scotty wouldn't see the body ahead. I could see the light from the open door and pulled us toward it. As I got closer to the door I knew that I would never be able to get Scotty past the after winch by myself.

At that point I saw a very beautiful sight. On either side of the door, waiting for me, were two more Keyport divers, Wally Rowland and Don Rodgers. As I got close to the door I passed Scotty off to them and squeezed through the door and past the winch. It was a great feeling knowing that I was out and the responsibility for Scotty was no longer mine.

As I reached the surface I was really excited and let the tension out. I kept yelling to Scotty, "We made it, we made it!" As firemen pulled Scotty out of the water I realized that Carl hadn't come up yet and I had broken the first rule of diving: I had lost track of my partner. I yelled to John that I was going back down for Carl and ducked under. As I headed back to the door Carl was just exiting and we returned to the surface. He had become lost inside the tug briefly because of the poor light and all the oil in his eyes from the spare facemask.

Once on the surface again I knew my diving was over for the day and I didn't plan on going inside the tug again. I told Wally and Don where to find the body and to please handle that for me. By the time I was pulled into the boat Scotty was already on his way to the hospital. I would never see or hear from him again.

Once in the boat I looked to where the ferry landing should have been but all I saw was trees. John and I both realized that we had drifted quite far down the canal while I was inside the tug. As our boat headed back toward the landing the tug tipped slightly to one side and slid under into the deep water in the center of the canal.

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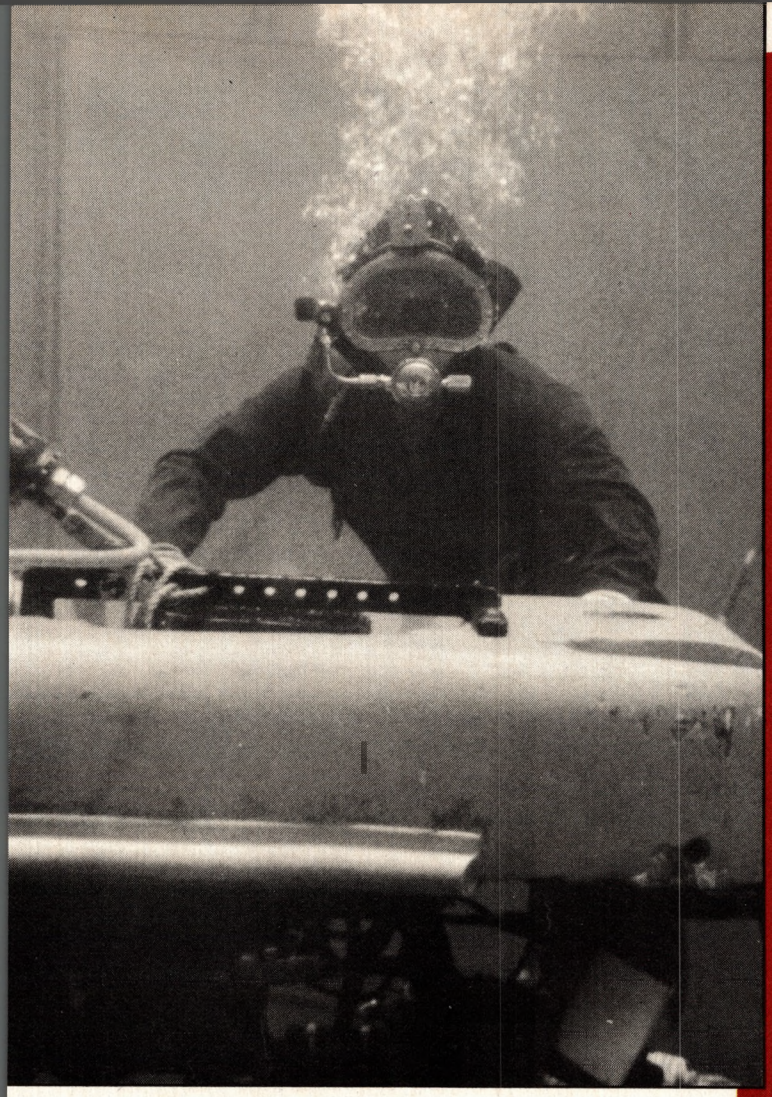
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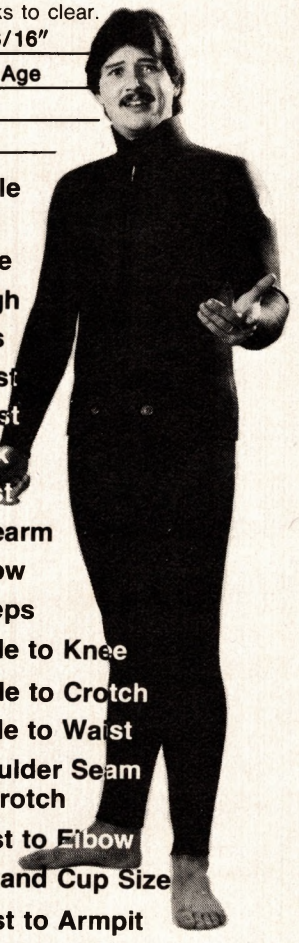
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Diving The Missouri

North Dakota's Ultimate Cold Water Dive

TEXT AND PHOTOGRAPHY BY ROBERT BUTTRY

As day breaks over the Missouri River, patches of mist can be seen vaporizing from its swirling water. We sit in our warm van with the heater running full blast, absorbing all the heat we can before starting our adventure down this magnificent waterway. The water exploding from the gates of the power house below Garrison Dam is a frigid 39°F but quickly drops to around 36° as it comes in contact with the cold 15° air.

Garrison Dam is the largest earth filled dam in the U.S., forming Lake Sakakawea, one of the largest bodies of water in North Dakota, with a total of 1,600 miles of shoreline. The lake was named after the Indian woman who guided the famous explorers Lewis and Clark through this rugged part of the Northwest. In Mandan Indian language Sakakawea means bird woman.

Garrison Dam spans three miles between the towns of Pick City and Riverdale, North Dakota. There are several good diving locations in the lake but usually the visibility is somewhat limited (about five to ten feet). In early spring and fall visibility can reach up to 20 feet. Before Garrison Dam was built the Missouri River was constantly flooding and cutting new channels, making it difficult for riverboats to navigate. Sandbars would appear and disappear almost overnight. The Missouri rightly deserved the name "Big Muddy." With the dam came new life to a cold and hostile land. Jobs were created, floods controlled, better irrigation was possible, but more important (to divers anyway) is the fact that the "Big Muddy" is now the "Big Crystal River" of North Dakota.

When Lake Sakakawea freezes over in the winter the mighty river takes on a new look. The ever present North Dakota wind now has no effect on the water in the lake and can no longer produce the high energy waves that contribute so much to the lake and river's low visibility. Soon most of the mud and other particles settle, leaving only cold, clear water with visibility reaching a whopping 30 feet.

The weather forecast calls for a high today of 35°F. This means we can probably make our dive and return to our van without the boat and diving equipment freezing solid. As we back our boat into the water we notice a thin layer of ice has formed in the water next to the ramp.

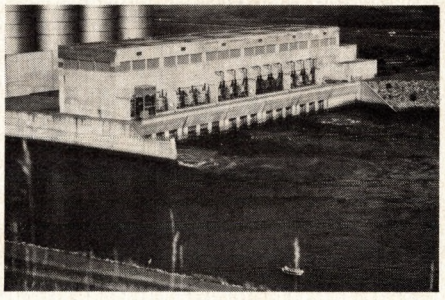
The best way to dive the Missouri River is with a boat, but sometimes it is hard to get anyone to sit in an unheated boat in the dead of winter watching red and white dive flags bob up and down as we drift dive. The current is usually running at about five to six knots which means we have to go with the flow. If any treasure is found divers simply ascend and the boat comes by and retrieves the loot. Treasure can be in the form of old buffalo skulls, modern anchors, fishing rods, tackle, bottles, etc.

With the boat launched and the outboard motor running, we are now ready to load our warm tanks and regulators on board. Divers help one another zip up drysuits and don three finger mitts. Some divers have ice masks, made out of one-eighth inch neoprene rubber, that completely cover the head leaving only the eyes and lips exposed to the icy water. When the face mask is put on only the lips are exposed. Our dive today will take us past the old abandoned town of Manhaven on the west bank of the river about a mile or so below the dam.

As we roll over the side of the boat into the water the current doesn't seem to be moving very fast, but as soon as we de-

scend to the bottom some 15-20 feet below we quickly realize we are flying. We equalize our bouyancy so we are able to float about a foot off the bottom. Under these conditions one literally has the feeling of flying without the aid of an airplane. The bottom passes under us changing from brown sand to small moss covered rocks, then to huge boulders 10-15 feet across. Huge trees, covered with a stringy, greenish-brown moss appear throughout the dive, usually studded with lead-headed jigs, and other fishing paraphernalia. Large coal veins appear and disappear throughout the dive.

The fish we pass along our watery flight path seem to be hibernating for the winter. Shovelnose sturgeon are everywhere, suspended a few inches above the bottom with their V-shaped noses pointing directly into the current, their protruding mouth extending down close to the bottom to sift any morsel of food that might drift their way. When we swim too close they turn sluggishly and swim down current, but with a couple of hard kicks from our fins we are able to reach out and grab hold of their bodies. The



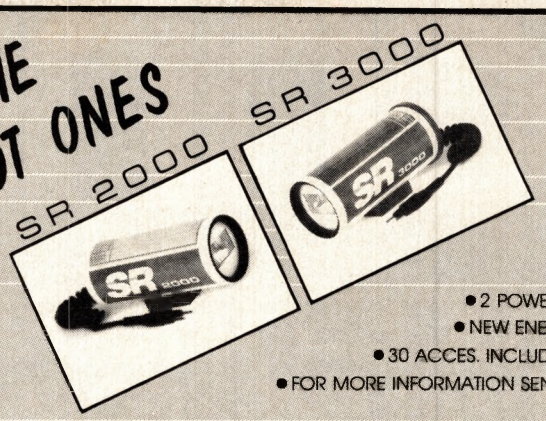
lingcod and catfish escape the effects of the current by hiding under logs and tree stumps, just waiting for their dinner to float by. The walleye and northern pike seem to vanish from the river at times during winter but once in awhile a courageous walleye will swim by with its dorsal fin erect, in the attack position, checking us out to see if we might be edible or maybe to see if we might be a potential mate. Usually the walleyes keep their distance and only the more observant diver will see them at all. The fish look very ghostlike when they first appear. Sometimes they will glide by with their glassy eyes fixed on you so hard they almost penetrate your drysuit. Any sudden movement and they're gone.

My pressure gauge is reading 500 psi now, we have been under the water for more than an hour and my hands are starting to feel the effects of the cold. When I reach the surface I see the other divers are already in the boat. As I crawl up the boat ladder I see two buffalo skulls and one 20 pound Danforth anchor—not a bad haul. We have drifted approximately a mile down the river on this dive so our boat ride back to the van will be a short one.

(Continued on Page 96)

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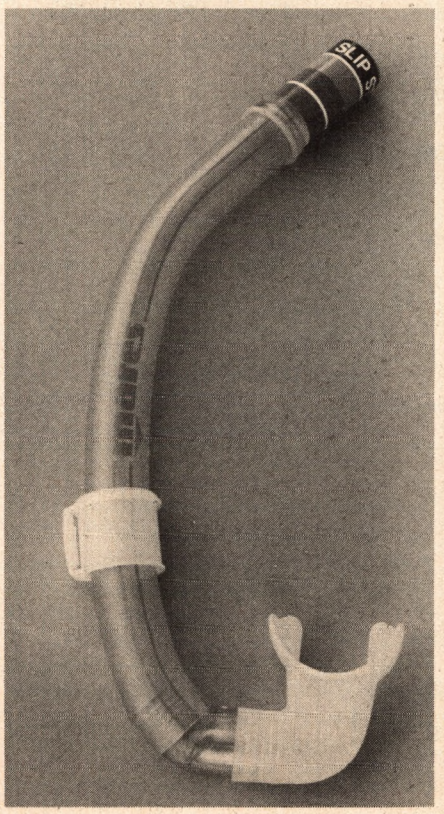
SUPERIOR DIVE TECHNOLOGY!

Mares Slipstream Snorkel

New Mouthpiece, New Keeper



photo/courtesy SeaQuest





The Slip Stream has a new, anatomically designed mouthpiece of clear silicone rubber. Soft and comfortable, it should eliminate jaw fatigue. A radically new keeper, called a slider, makes attaching the snorkel to a mask easy. When not in use, the snorkel slips down and out of the way.

TEXT AND PHOTOGRAPHY BY BONNIE J. CARDONE

What more could they do to a snorkel? There seem to be hundreds available. They come with straight, flexed and contoured barrels in every color of the rainbow as well as black neoprene and clear silicone. Some snorkels have devices on the top that keep water out; others have valves on the bottom that allow water to drain. Mouthpieces fit both large and small snorkelers and some even swivel.

Over the years only one part of the snorkel escaped change. Until now that is, with the introduction of the Mares Slip Stream. What is new about this snorkel is the way it attaches to the facemask. Gone is the venerable snorkel keeper, in its place is a slider. This latter is an inch long silicone cylinder with an attached ring that fits over the top and is secured by a lip at the top of the tube. While this sounds complicated, a look at a photo of the slider will show you it is not. The slider holds the snorkel to the mask. When the snorkel is not in use, the slider allows it to slip down out of the user's way.

The slider slips up and down the barrel of the snorkel easily. Although you can push or pull it off, it will not slip off by itself because there is a ridge about two inches from the tip that prevents this. Under the ridge there is a silicone O-ring. If you want the snorkel to stay near your mouth, you can move this O-ring down the barrel until it puts the mouthpiece right where you want it.

Although the Slip Stream can be used with any mask, it is especially designed to be used with Mares masks. Instead of being split, the headstraps on these have holes in them. If you place the slider in the hole nearest the faceplate, it will hold the snorkel so the tip is out of the water when you are in a snorkeling position.

The Mares Slip Stream has a large bore, clear plastic barrel. Designed to be used on the left side, the snorkel fits close to the face to eliminate drag. The silicone mouthpiece on the Slip Stream has been orthodontically designed. It is contoured to fit in the mouth comfortably. The bite tabs are rounded and of variable thicknesses so they can be held easily by the teeth. The mouthpiece swivels so the user can adjust it for a custom fit.

SKIN DIVER tested the Slip Stream on four Catalina dives. The slider makes it easy to attach the snorkel to the mask: This is actually simpler than a conventional keeper because you don't have to wrestle it down the barrel once you've got it attached to the mask strap. It was easy to find the mouthpiece and the slider slipped easily along the barrel when I put it in my mouth. The soft mouthpiece is quite comfortable and because it's silicone it should last a long time.

The suggested retail price for the Mares Slip Stream is $22. It is available from your SeaQuest dealer.

Wenoka's Mix 'n Match WET SUIT

TEXT AND PHOTOGRAPHY BY BONNIE J. CARDONE





New from Wenoka this year are wetsuits. There are several different styles of tops that can be worn alone or with one of two farmer john pants. Pam Cardone models the Viva shorty and the Armada farmer johns. The Viva has high pile nylon inside, Darnel outside. The farmer johns are nylon II.

Wenoka, once known only as a manufacturer of knives, now produces a diverse line of dive equipment. The company's SeaStyle wetsuits were introduced this year. A typical Wenoka product, they are good looking and well made. Divers can choose from two different materials and several different styles.

SKIN DIVER's test suit featured the women's Viva shorty teamed with Armada farmer johns. The step-in Viva has French cut legs, raglan sleeves and a heavy duty YKK nylon zipper down the front. The suit is made of Therma-Ply® neoprene with an exterior of durable Darnel and an interior of high pile nylon. The suit slips on and off easily and, because the pile minimizes water exchange, it is very warm.

The Viva is navy blue with a red, V-shaped insert on the front and a red stripe down each arm. It comes in either 3 or 6 mm (approximately one-eighth and one-quarter inch) Therma-Ply and can be worn alone or with either the Capitana or the Armada farmer johns.

The Armada farmer johns are nylon II; that is, neoprene with a layer of nylon on both the inside and the outside. They also slip on and off easily. This process is facilitated by the heavy duty YKK nylon zipper (women's model only) that runs from under the left arm to just below the waist. The Armadas feature a Velcro® closure on one shoulder and padded knees. The main color is navy blue and there is a royal blue stripe on the outside of each leg.

The Wenoka SeaStyle suits appear to be very well made. All of the edges are finished with Lycra tape. The suits have few seams. Diamond gussets under the arms and at the crotch facilitate movement and add to comfort. The neoprene used is the small cell type that is supple, flexible and recovers well from compression at depth.

SKIN DIVER tested the Viva/Armada combination in 60°F water off California's Catalina Island. Several underwater photographers commented on its good looks as I suited up. It kept me warm on two 30 minute dives and was comfortable during topside intervals as well. The suit is made with a minimum of seams. Diamond gussets under the arms and at the crotch facilitate movement and add to comfort.

Wenoka's wetsuits are mix 'n match: There are several different tops that can be worn alone or teamed with either of two farmer john styles. Because Wenoka wetsuit materials are so flexible and there are so many sizes available, the company does not make custom suits. All of the tops and pants come in sizes ranging from XS to XL, some styles are also available in XXL. In the 3 mm suits, prices for each wetsuit piece range from $123 to $198; in 6 mm, from $143 to $211. Wenoka also makes matching booties, hoods and gloves. See all of Wenoka's new products at your nearest professional dive store.



The Metzeler Brigant LS

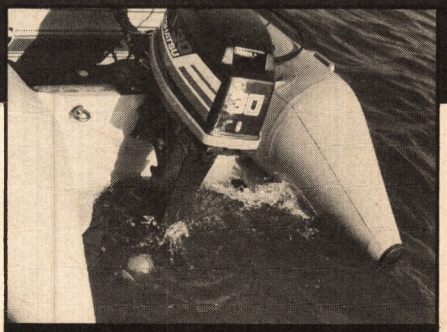
An Economical, Maneuverable 13 Footer

TEXT AND PHOTOGRAPHY BY FRED FISCHER

Even as I drove toward the dock I knew the Metzeler representative had arrived ahead of me. The brilliant yellow, required to meet German safety standards for visibility, gleamed from the skin of the Brigant LS. Dick Gehr, western regional manager for Leisure Products Marketing Systems, Inc., which imports Metzeler boats into the U.S., appeared ready to demonstrate a fast 13 foot inflatable outfitted for water skiing. He soon learned that Dave, my diving buddy of many years, and I had other plans for the boat. We came with coldwater diving gear for three and planned to motor out of San Diego's Mission Bay into the open ocean for testing. My announcement that the optional steering mechanism and two inflatable bench seats had to go was greeted with a slight wince from Dick. He quickly removed two eye bolts and the front seat was gone. Realization that removal of the steering mechanism was more involved prompted us to leave it and the back seat in position for the test.

Before launching we became aware of several features unique to the Metzeler Brigant LS. The most apparent was the overall rigidity of the boat. This is owing to the relatively high inflation pressures of the three independent chambers and a special low stretch fabric. The outer pontoons are pumped to 4.2 psi and the inner keel to an incredible 8.5 psi. A handpump with double stroke action is provided to achieve these pressures, which are registered on a built-in pressure gauge. The three layer fabric has a core of 1100 denier polyester fabric known as Trevira. It stretches less than one percent. Nylon, used in many inflatables, stretches seven to ten percent. Polychloroprene (a trade name of DuPont), is rolled into one side of the fabric that lines the pontoons. A yellow pigmented elastomer that resists sun, abrasion, gas and oil is bonded to the outside of the fabric. For extra-strength seams, a butt joint is utilized. Two pieces of fabric are first stuck together back to back and a strip of reinforcing tape is run along the chloroprene side. The protruding flap is then folded over and the whole seam is hot vulcanized. Seams on the pontoons run parallel to the water line in order to reduce the number of pieces of fabric and to increase flexural strength.

The stern section is also unique. The pontoons terminate in cones that extend well past the transom and point into the water, providing additional buoyancy for the support of a large engine (50 hp maximum). The transom is removable and attached to the last floorboard with a heavy duty hinge and two stainless steel rods set at 45 degrees. An outer layer of fabric





The Brigant LS is a bright yellow, 13 foot long inflatable. The unusual pontoons end in cones that extend past the transom and point down. The boat has an inflatable keel as well as a removable wooden transom and wooden floorboards. There are several conveniently placed handholds.

TEKNA MASK



photo/Bonnie J. Cardone

BY JIM WALKER

The diver had just found a huge lobster but before he made a grab for it he needed his buddy to cover the back entrance to the animal's lair. His buddy was only a few feet away and looking in his general direction, so the diver waved him over. However, the buddy turned away and continued his own lobster search—he obviously hadn't seen the gesture. Exasperated at having to leave his bug, which had now backed farther into its hole, the diver swam toward his buddy, waving to get his attention. The diver had to swim until he was nearly directly in front of his buddy before the buddy finally saw him. By that time the surge had moved them both and the diver had lost track of his lobster's den.

If the buddy in the above example had been wearing a mask that allowed a wide expanse of peripheral vision he might have seen the diver waving at him right away and shared in a lobster dinner later. A wraparound mask might have saved the day. If you have considered such a mask but decided against purchasing one because of the increased size and volume previously inherent in this design, consider the Tekna Mask 1. This new product has four tempered glass lenses. By themselves, the two large lenses in front of the eyes offer a wide view. In my case this was 90 degrees, top to bottom and side to side. The two smaller windows at the sides of the mask widened my view (direct and peripheral combined) to nearly 180 degrees side to side. And, the corners of the mask separating the front lenses from the side windows were exactly at the point of widest direct vision when turning my eyes to the side. Thus, I experienced no distraction from the window junction.

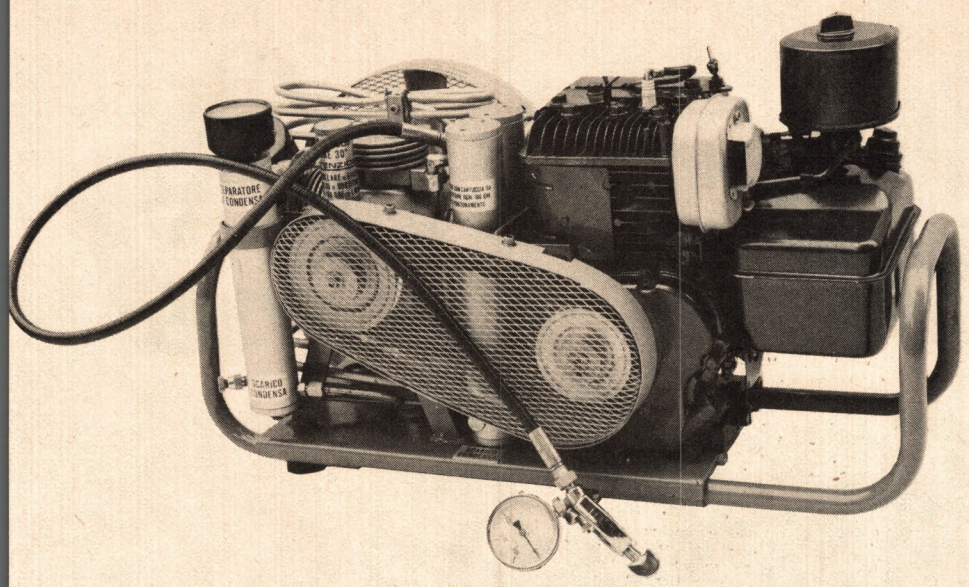
One reason this mask has such a wide angle of view is that it is relatively small and, thus, low volume. It measures only 6.5 inches across the frame, which is anatomically curved to set the lenses in close to the eyes. It is also light for a wraparound—only 10 ounces. (Tekna says it has 30 percent less weight and volume than any other wraparound.) This low volume not only increases the view but makes the mask almost as easy to clear as a non-wraparound.

The mask skirt is surgical grade silicone rubber—resistant to breakdown by ozone as well as being hypoallergenic. It is soft and has a double face seal. The nose pocket is easily reached with gloved fingertips.

The mask strap adjusts (on each side) through a spring loaded latch with a roller. This is the simplest adjusting mechanism I have come across. Underwater or above a one-handed pull on the end of the strap tightens it. To loosen the strap simply push in on the spring loaded latch with the little finger while pulling back on the main portion of the strap (next to the head) with the thumb and first finger.

The Tekna Mask 1 frame is sturdy, non-corrodible polycarbonate. With the clear silicone skirt the frame is available in (translucent) candy apple red, cobalt blue and citrine yellow. An opaque black frame/black silicone skirt combination is also available. Matching Tekna snorkels are available for each combination.

The Tekna Mask 1 retails for $69.95 and has a one year limited warranty. Widen your view with a look through it at your Tekna dealer, or contact Tekna, P.O. Box 849, Belmont, CA 94002.



American Radhial's Coltri MCH-6 Portable Compressor

TEXT AND PHOTOGRAPHY BY GEORGE COZENS

More than once I've dreamed of traveling to some distant shore to dive a virgin area—someplace, perhaps, where no other divers have been. The adventure of exploring a reef or wreck that is yet unseen by human eyes, and more important, unmolested by earlier divers, is both exciting and recurring. For increased range and time underwater the logical choice is scuba diving. But, filling tanks in a remote area can be a problem.

Fortunately, this problem is easily solved with a portable air compressor—such as the beautiful little machine featured here. Compact and light weight, the versatile Coltri MCH-6 need not be restricted to exotic, far-off locations: It can find many uses on local, multi-dive beach and boat trips where a large commercial compressor is too inconvenient or there is simply not enough room to carry extra tanks. Although the Coltri MCH-6 can deliver a surprising amount of air for its size, it wasn't designed to substitute for a large, stationary compressor. It is intended, however, to easily satisfy the compressed air needs of a small group.

The Coltri MCH-6 is made by Aerotecnica Coltri, an Italian company formed in 1966. It is distributed in the Americas by American Radhial, Inc. This model has been on the European market for the last decade and available in the U.S. for the last two years. MCH-6, the model number, is actually an abbreviation, indicating the compressor can deliver six cubic meters of air per hour—that translates to 3.55 (standard) cubic feet per minute.

Weighing in at only 70 pounds and occupying a space of about 27 by 12 by 17 inches, this machine is truly portable. Power on U.S. units is provided by a five hp, four cycle, single cylinder, air cooled Briggs & Stratton gasoline engine, with a maximum rating of 3,600 rpm. B/S engines have a reputation for dependability and needing low maintenance. Plus, B/S service and parts are available worldwide. The compressor is a four stage, four cylinder, air cooled design, featuring Teflon coated pistons, aircraft tubing and fittings (with American-sized threads) and maximum ratings of 3,400 rpm and 4,408 psi. Prior to leaving the factory the engine is preset to run at a maximum of 2,500 rpm, so both the engine and the compressor operate well below their maximum capacities, thus reducing wear and prolonging their lives. Air is filtered in four different steps. An inlet filter screens out particulate matter from the air before it gets into the first stage of the compressor. After leaving the last compressor stage, moisture and oil vapor are removed by two condensate separators in tandem. The final step of air purification is accomplished by an activated carbon filter. A U.S. analysis of the gas compressed by a Coltri unit testifies to the high purity of the air and to the effectiveness of the filtration system.

Air pressure is measured on two separate pressure gauges. The first is mounted on top of the first condensate separator and reads in units of psi and bars (a bubble in this gauge can be used to keep the compressor level). The second is on the filler hose yoke and can be ordered with a dial reading in psi or in kg/cm^2. Output air pressure can be set with an adjustable pressure relief valve, up to 220 bars, or about 3,200 psi.

Routine care of the compressor is relatively simple: drain the condensate every 10 to 15 minutes (of operation); change compressor oil after the first 10 hours and every 250 hours thereafter; replace the carbon filter every 15 hours; and check the intake filter every 25 hours.

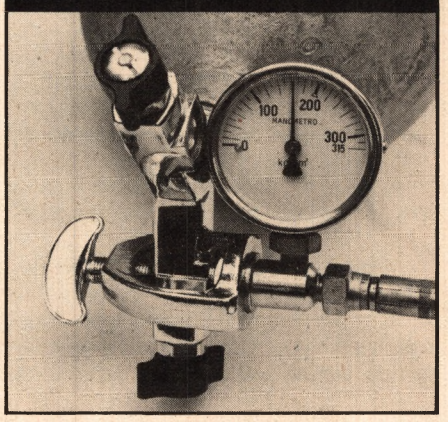
In my own evaluation, I found the compressor easy to operate. It took about 20 minutes to fill a standard 72 steel tank from an initial pressure of 200 to a final pressure of 2,250 psi, and slightly less than 30 minutes to fill an empty (almost 0 psig) steel 90 tank to 3,000 psi. Gasoline consumption should range between four to six tank fillings per gallon of gas. And, the noise level? It's about as loud as a typical gas powered lawn mower.

Options for this compressor include a five hp electric motor, an extended air intake tube and spare filter cartridges—the latter two are highly recommended and cost about $25 each.

With its small size, light weight, relatively large capacity, two year limited warranty and an affordable retail price of $1,795, the Coltri MCH-6 compressor appears to be a real winner. Perhaps it can expand your diving horizons.

For more information on this and other Coltri compressors, contact American Radhial, 136 Charwood Circle, Rochester, NY 14609: (716) 637-4150.

The MCH-6 portable compressor weighs only 70 pounds and can fill a 90 cubic foot steel tank from 0 to 3,000 psi in less than 30 minutes. It has two pressure gauges—one on the first condensate separator and the second on the filler yoke hose.





A Swedish Import With A Few New Twists

The Dyfo Sub 35

TEXT AND PHOTOGRAPHY BY GERI MURPHY

Just about the time you think you have seen it all, something new turns up that starts you talking to yourself. The Dyfo Sub 35 is just such a product. I have seen and used a lot of underwater camera housings over the past 17 years, but the Dyfo Sub 35 has me wondering if it's time for a new housing for my trusty Nikon with motor drive. Manufactured by Dyfo Systems of Onsala, Sweden, this unique import offers some refreshing new concepts in U/W camera housing design.

BASIC CONSTRUCTION

The basic construction of the Dyfo Sub 35 is much like most other metal housings. It is a two piece anodized aluminium casting with interchangeable lens ports. The two pieces of the housing consist of a primary body and a back door for easy camera access. The back door seals with a standard O-ring gasket and is held in place by four spring-loaded latches.

What makes the Dyfo Sub different is that it is built like a tank. The interior walls are heavily ribbed for extra strength and the corners of the housing and the spring clamp mounts have added thickness. The squarish box design and flat bottom provide excellent horizontal stability U/W. It appears this housing was designed for rugged use in frigid Scandinavian waters.

There are a number of nice design features incorporated into the housing. For example, the rear of the housing body has a one-half inch wide flange surface for the O-ring gasket seal. There are two locating pins on this flange which line up with the back door, thus assuring a perfect seal every time. The housing is equipped with pistol grip handles on both sides, allowing the user to carry the unit with either hand.

The Dyfo Sub 35 is a fairly versatile housing that can accept a variety of 35 mm SLR cameras. The model we tested came equipped with a Nikon F2 with motor drive and wide screen action finder. It would just as easily fit the Nikon F3, Olympus, Nikon FA, Minolta or a Canon F1. The manufacturer provides enough shims and spacers to allow adaptability for many different models.

The camera is mounted against the

back door and raised off the floor of the housing approximately three-quarters of an inch. This is a safety feature: If any water leakage occurs, the camera and battery pack would not get wet. The only disadvantage to this design is that the camera must be unmounted from the housing for film reloading, which means disconnecting the shutter/motor drive and the flash connectors. One good piece of news is that the aperture control linkage does not have to be unbolted. It simply slips out of a locating pin. While film reloading may be a bit troublesome, the other advantages of the housing certainly compensate for this small annoyance.

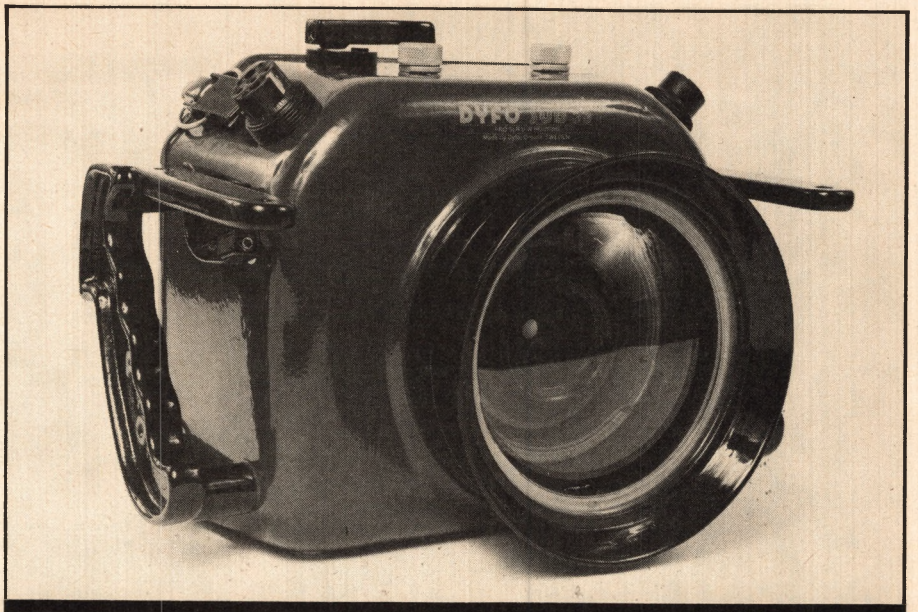
SPECIAL FEATURES

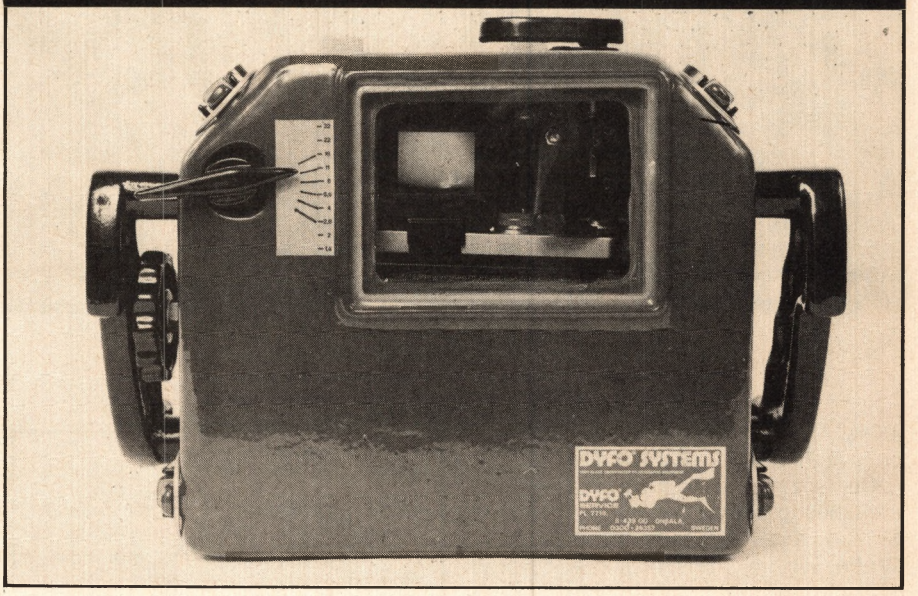
When it comes to special features, the Dyfo Sub 35 certainly shines. This is where Dyfo distinguishes itself from the other housings on the market. The most startling innovation is the rear viewport. In place of the standard one and one-half inch diameter round viewing window, Dyfo has installed a giant rectangular window three inches high and four and one-half inches wide. It seems as big as a living room picture window! This port is constructed of one-half inch thick optical plexiglass sealed in place with silicone rubber adhesive.

The giant rectangular window allows easy viewing of the camera's viewfinder as well as other controls. In the case of the Nikon F2, you can clearly see the shutter speed dial, manual film advance, manual shutter button and electronic motor drive button. You can even observe the linkage on the front lens focusing ring. The large window allows a great deal of light to penetrate the interior of the housing for illumination of the controls. It adds new ease to underwater operation.

Another radical departure in housing design is the use of belt drive for the focusing gear. Again, Dyfo Sub has done something really different. The focusing knob on the left side of the housing is connected to a 2.5 inch diameter pulley wheel. The focusing ring at the base of the lens port is a matching 4.5 inch diameter pulley. Both of these pulleys are grooved to accept a 3/16 inch diameter non-stretch nylon belt. It wraps around the focus knob pulley and makes the turn at the corner of the housing via two small roller pulleys mounted on stainless steel bearings. This pulley system provides exceptionally smooth and finite control of camera lens focus. The slightest touch of the focus knob immediately activates the lens barrel of the camera. There is no delay or play.

Another welcomed feature, which might not be so noticeable at first, is the shutter release lever. Dyfo Sub has incorporated a combination electronic shutter release and manual shutter release on the same shaft. Should the electric circuitry in your motor drive fail or the batteries go dead, it is a simple matter to switch to manual shutter release. All that is required is a slight adjustment with an allen wrench. In fact, with a little experimentation on the adjustment screws, we were able to set up the housing so both levers made contact with the two shutter buttons almost simultaneously. If the electronic shutter did not fire, slightly more pressure would trigger the manual release.





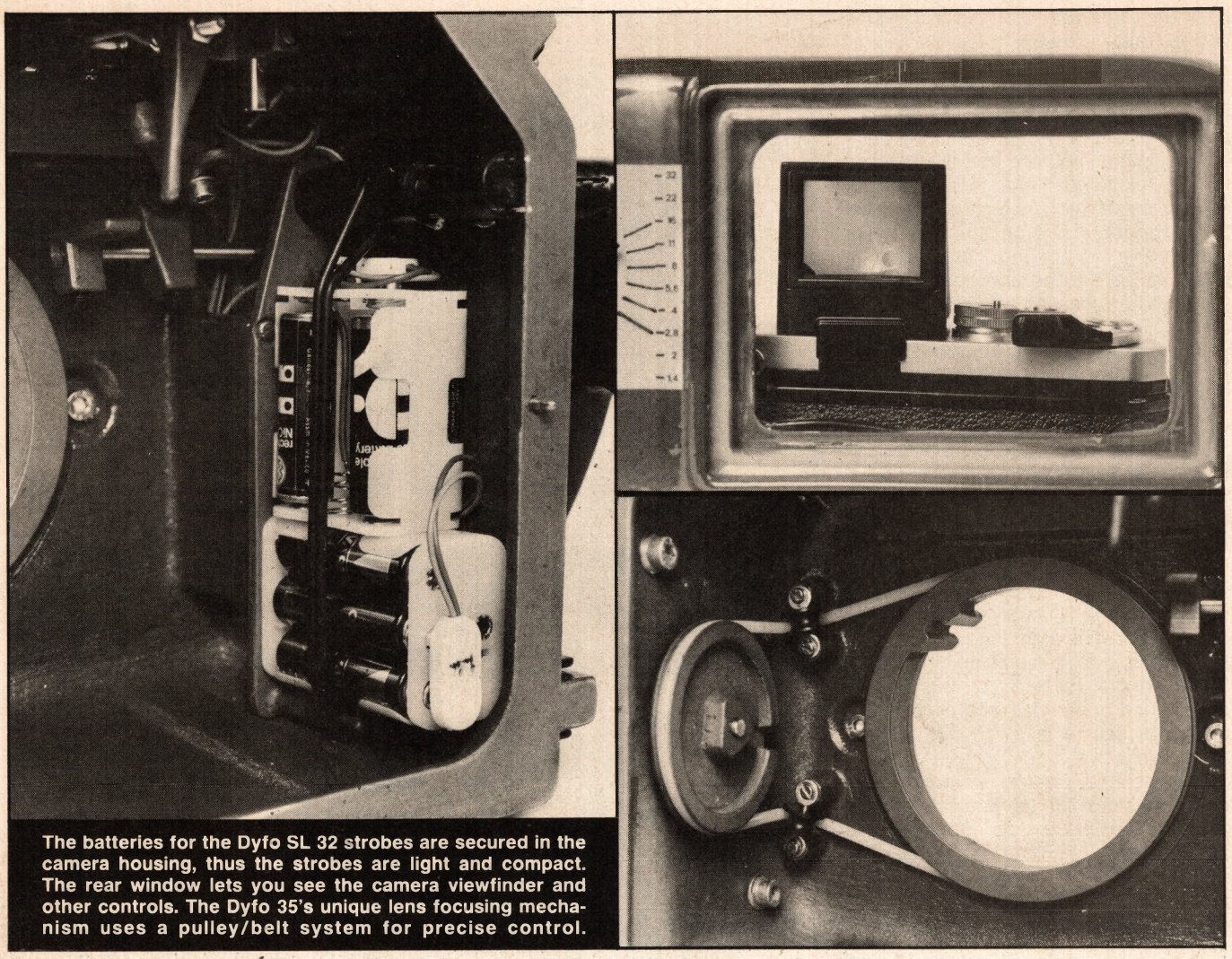
The Dyfo Sub 35 housing has a two piece, anodized, cast aluminum body and features interchangeable lens ports. It can be set up to accommodate a variety of 35 mm SLR cameras. The rear door seals to the front utilizing an O-ring, aligned by locating pins. Four spring loaded latches secure the door and it has a huge viewport.

Needless to say, a housing as sophisticated as the Dyfo Sub 35 would naturally have interchangeable lens ports. Again, Dyfo has done something different by constructing two basic ports and two different size spacer rings. The two basic ports are a short dome for wide angle lenses (18 to 28 mm) and a long flat port for macro lenses (55 to 105 mm). By using spacers and ports, you can accommodate most lenses used U/W.

Both the lens ports and spacers are fitted with dynamic sealed O-rings. The interesting twist here is that the spacers and ports are bolted together with allen screws for rigid mounting and prevention of accidental leakage.

FLASH SYSTEM

Heard enough? Wait, there is more. Dyfo has designed a flash system that is a radical departure from current systems and one that offers some special advantages. The company has built its own strobe units, flash arms and articulating



The batteries for the Dyfo SL 32 strobes are secured in the camera housing, thus the strobes are light and compact. The rear window lets you see the camera viewfinder and other controls. The Dyfo 35's unique lens focusing mechanism uses a pulley/belt system for precise control.

joints. They integrate beautifully with the unusual housing.

On the upper side of the housing there are holes to accept two female Sea Plug SP 320s and switches for the Dyfo SL 32 strobe system. The holes are covered with O-ring sealed blind plugs so the strobes can be installed by the photographer as the system is enlarged.

The two flashes operate from central battery power packs inside the housing. The strobes can be operated independently as well as together. Two switches on the top of the housing allow either strobe to be switched on or off. The Dyfo photographer can shoot with flash from left, flash from the right, or double flash—simply by manipulating the switches.

The Dyfo strobes are exceptionally lightweight heads—easy to position and manipulate. Because the battery packs are in the housing, the strobes are small.

Dyfo has a revolutionary flash arm design. It consists of six and/or ten inch long aluminum tubes and articulating joints of Delrin. There are two tubes and three joints per flash arm. The tubes and joints assemble and disassemble quickly and simply with spring loaded locating buttons. You can make the flash arm any size you choose. A short arm is ideal for macro, while the long arm would be more appropriate for wide angle work.

DYFO SUB 35

Housing material	Aluminum alloy
Weight in air	16.5 lbs. with Nikon F2 batteries, 24 mm lens, motor drive
Buoyancy (sw)	Approx. neutral
Cameras accepted	Major brands
Depth rating	330 feet
Lens ports	Dome (18-28 mm) Macro (55-105 mm)

Special Features: Huge rear viewport, belt drive focusing gear, electronic/manual shutter release, allen screw secured lens ports, optional strobes operate together or independently, strobe batteries accommodated in camera housing.

CONCLUSION

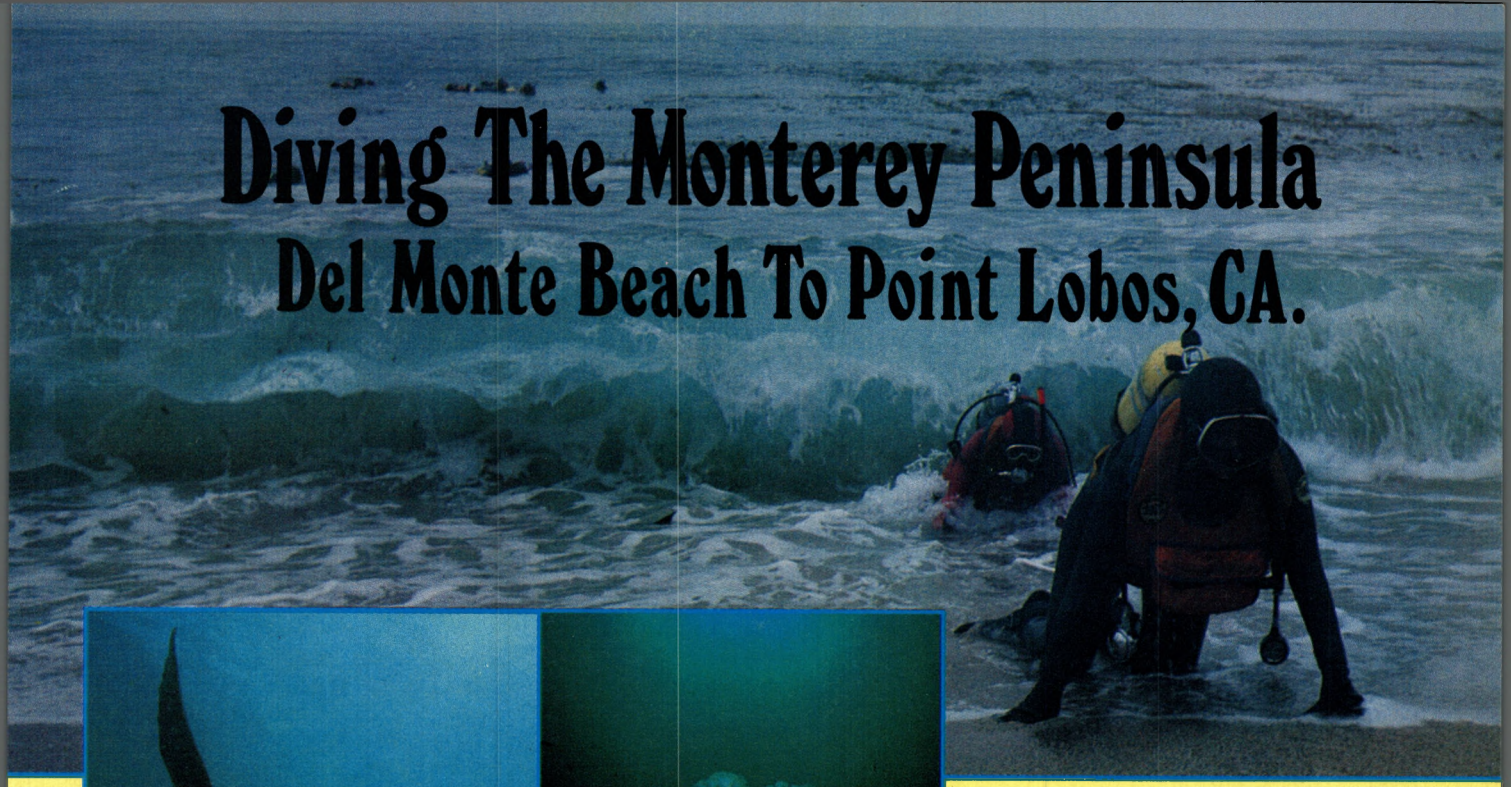
Our tests with the Dyfo Sub 35 were a delight. The housing ran through its paces beautifully—no leaks, no malfunctions, no misfires, no hassles.

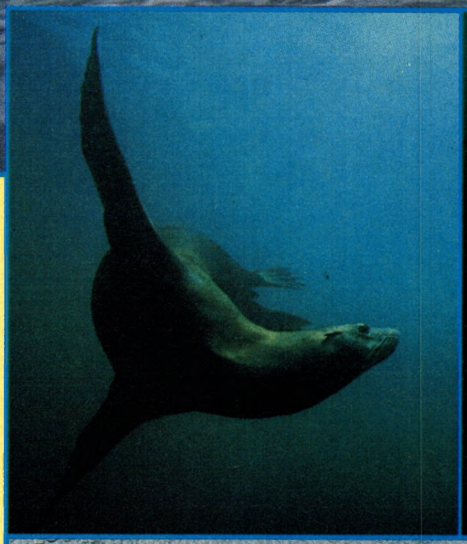
Admittedly, the unit is a bit heavy out of the water. The housing, complete with Nikon F2, 24 mm lens, motor drive and batteries for the strobe, weighs 16.5 pounds in air. However, it is almost neutrally buoyant in saltwater. The trade-off for the weight is durability, dependability and stability—I can live with that!

The Dyfo Sub 35 housing is imported and distributed in the U.S. by The Creative Whale. It sells for $869 to $1,759, depending on the camera/lens configuration and accessories/flash units desired. For more information and brochures, contact: The Creative Whale, 940 East Roosevelt Road, West Chicago, Illinois 60185; (800) 323-9483 (U.S.), (312) 231-3301 (Illinois and Alaska).

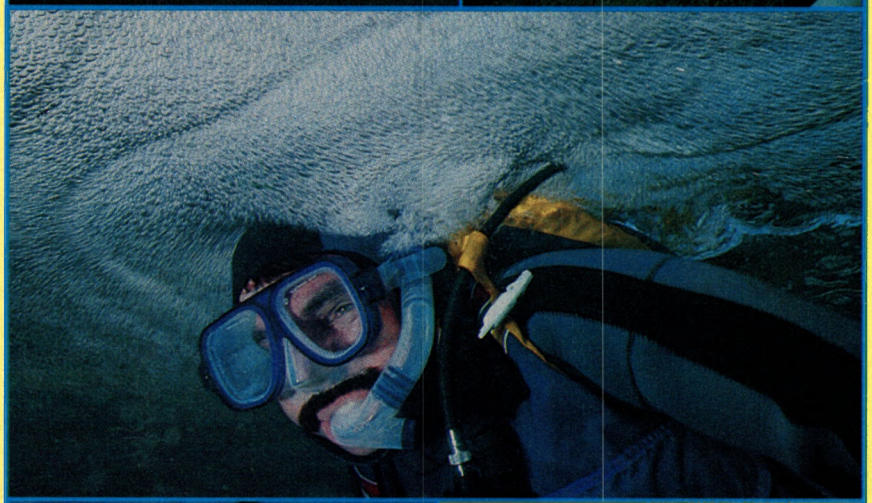
Diving The Monterey Peninsula

Del Monte Beach To Point Lobos, CA.











Monterey diving conditions include surf entries, cold water and surge, but an amazing array of marine life makes it all worthwhile. Kelp beds provide the habitat for sea lions, sea otters, anemonies, octopus, halibut and a host of encrusting organisms for macro photography.

TEXT AND PHOTOGRAPHY BY STEVE ROSENBERG

The Monterey Peninsula, from Del Monte Beach in Monterey Bay to Point Lobos State Reserve, is by far the most heavily dived area in all of Central and Northern California. Dive shops from all over the northern half of the state send basic classes to Monterey for their checkout dives. Certified divers drag themselves out of bed at 3:00 or 4:00 in the morning in order to drive more than 100 miles, stuff themselves into quarter inch wetsuits and jump into 50°F water.

For anyone who has not dived in Monterey's magnificent kelp forests or submarine canyons, it might seem somewhat perplexing that so many people would put themselves through so much apparent discomfort. Tourists, who come to visit Monterey to stroll along secluded beaches, browse through shops along Cannery Row and dine at the romantic little restaurants in Carmel, watch divers with fascination, but never really imagine the beautiful world they are missing.

In Monterey divers learn to deal with surf, surge, cold water and the inconvenience of a full wetsuit or drysuit. However, Monterey is also beauty and excitement. Divers are able to see things here that they won't find in warm water dive spots. Playful sea otters and sea lions, diving birds and incredibly diverse and colorful reef communities provide just a few of the attractions in this area.

Most Monterey diving is done from shore. Beach diving, where some amount of surf is the rule, requires specialized skills. Divers coming to Monterey for the first time should limit their initial dive to those areas where the entries and exits are well protected. It is always a good

MONTEREY

idea to talk to local divers and perhaps find a dive buddy familiar with the area.

The Monterey Peninsula is truly an incredible place to dive. However, because diver traffic is heavy, many of the local municipalities have passed ordinances which affect diving, including restrictions on parking, gearing up and beach-related activities. In addition to obeying fish and game laws, divers should be aware that some of the dive areas, including Hopkins Reef, parts of Pacific Grove and Point Lobos are marine reserves where spearfishing is strictly prohibited. Divers should inquire at local dive stores, not only to check on current surf and weather conditions, but also to ensure their dive plans are not in conflict with local laws.

The most popular dive sites in Monterey provide a wide variety of diving experiences for novice and advanced divers. The largest stretch of beach inside Monterey Bay is **Del Monte Beach**. This is one of the best areas in the county to hunt halibut, which seem to prefer the open sandy regions where they forage for small mollusks and crustaceans. Most of the bottom off Del Monte Beach is shallow and sandy, less than 40 feet deep. Approximately 100 yards offshore there are a series of low shale ledges or shoals that host a variety of marine life, including starry flounders, octopi, blennies, anemones, sponges and an occasional stand of kelp. Not far from shore, near the Holiday Inn, there are also several sunken barges, surrounded by fields of purple sand dollars.

One of the most popular places to hunt halibut is called the **Laundromat**, named after a laundromat near the corner of Park and Del Monte. A broken reef, which can be found by swimming straight out from the end of Park Avenue, lies perpendicular to the offshore shoals.

On the northwest side of Monterey Harbor there is a manmade rock jetty extending outward into the bay from the Coast Guard pier. This area is commonly referred to as the **Breakwater**. At the intersection of Cannery Row and Foam Street there is a parking lot, restroom facilities and a boat ramp.

On the outside of the Breakwater there is good beach access. This is one of the safest entry points in Monterey and, therefore, receives heavy use by instructors for basic classes. The surf here is almost always calm, allowing for easy entries and exits.

A kelp bed grows along almost the entire length of the Breakwater on the ocean side. The rock jetty slopes to a sandy bottom in about 60 feet of water. Although the visibility is usually not as good here as it is at other locations, the area hosts a wide variety of marine life including playful sea lions, otters, diving cormorants and monkeyface eels. Because of the easy access and because the rock jetty provides a good reference point underwater, this is also an excellent place to make night dives.

About 200 yards offshore at the intersection of a line drawn from the tip of the Breakwater to Cabrillo Point (Hopkins Marine Station) and a line drawn as an extension of Reeside Avenue, lies an area called the **Metridium Field**. Protruding from a flat sandy bottom in 60 feet of water are hundreds of rocky outcroppings covered with the billowy white *Metridium* anemones, with stalks extending up to two feet in length.

Tube anemones and seapens dot the sandy bottom around the rocky areas where small octopi and crabs forage. Although the area is within reach by a long swim from from shore, it has a lot of boat traffic and it is safer to dive from inflatables. The visibility in this area rarely exceeds 15-20 feet because of the amount of plankton in the water, which is also probably responsible for the large numbers of sedentary filter feeders here.

Another popular spot for conducting basic scuba classes is **McAbee Beach**. It is at the corner of Cannery Row and Hoffman Street next to the Casa Maria Restaurant. This heavily used area has a thick forest of kelp and a jumbled rocky reef, thickly populated by a multitude of marine denizens including seahares, crabs, anemones and rockfish.

Divers must gear up in the parking lot a block away from Cannery Row and walk to the beach. The parking lot is metered and has no restroom facilities. Because of the influx of visitors to the new Monterey Bay Aquarium, parking is now at a premium and often only available for divers in the early hours of the morning. Also, divers should pay attention to the restrictions on the loading and unloading of dive gear. These are posted along Cannery Row.

Hopkins Reef is a protected reserve outside Hopkins Marine Station at Cabrillo Point in the city of Pacific Grove. This reef is accessible by boat or dive board only and there is a strict ban against spearfishing, enacted by the legislature in 1985. The area is principally used by the students and faculty of Hopkins Research Station for conducting experiments. Divers visiting the area should be extremely careful not to disturb any of the research projects in progress.

Lover's Point, a scenic tourist attraction in Pacific Grove, is on Ocean View Boulevard at the end of 17th Street. Lover's Point is a popular dive site for classes, photography and sightseeing. There are beach access points on the east side (cove area) and on the west side (ocean side). Access on the cove side is well protected from heavy surf by a short

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breakwater and the point itself. In addition, the cove has a gently sloping, rock free sandy beach. In the past, the city of Pacific Grove has attempted to place limited restrictions on access to the ocean on this side of the point. Although a preliminary injunction currently bars enforcement of Pacific Grove's prohibition on diving at Lover's Point and no restrictions are in effect at this time, divers should check with local dive stores to determine whether there are any restrictions on parking or access. Access on the west side of the point is from a rock strewn, sandy beach that may afford hazardous entries during periods of heavy wave action and large swells. Restroom facilities are available in the scenic park area overlooking the ocean and limited parking is available along Ocean View Boulevard with a strictly enforced two hour time limit.

There is generally good visibility at Lover's Point at depths from 20-60 feet. The marine life is colorful and varied, with divers often seeing bat rays, torpedo rays, schooling rockfish and a friendly harbor seal named Spot, cruising the sandy areas between tall rocky outcroppings and thick stands of kelp. The rocky surfaces are covered with living carpets of sponges, anemones, starfish, barnacles and nudibranchs. Spearfishing is prohibited in this area also.

The best diving at Lover's Point is on the oceanside, beginning at about 100 yards offshore in about 30 feet of water. Here the sandy bottom gradually slopes into deeper water around massive rock pinnacles 15-30 feet high.

Another good dive site, **Otter Cove**, is only a couple of blocks away from Lover's Point at the corner of Ocean View Boulevard and Sea Palm Avenue. There is a narrow rocky beach at Otter Cove that can be reached by climbing down a stairway that is usually in varying degrees of disrepair. Entry is more difficult here because the water stays very shallow (waist deep) for a long distance from the beach. If the surf is at all heavy, divers can become tangled in the kelp or be thrown against jagged rocks. However, on calm days, this area provides fairly easy access and the diving is well worth the long swim out. Once beyond the surf line the bottom drops off very quickly to 50 feet, where rocky pinnacles protrude like miniature mountains from the sandy seafloor. Large crabs, rays and schools of fish frequent this area.

Coral Street Beach is another well protected beach access often used by instructors for basic classes. At the corner of Coral Street and Ocean View Boulevard, this location has the attraction of plenty of parking, a fairly large flat sandy beach and a natural breakwater to protect against swells. There are, however, no restroom facilities at the site.

The bottom drops off significantly between 400 and 500 yards offshore. Here the broken sandy bottom is replaced by small caves, rocky canyons and steep vertical walls. This area, known as **Chase Reef**, is a beautiful spot for underwater photography. Steep walls drop from 50 or 60 feet to depths of 100 feet or more. The surfaces of the walls are completely overgrown with encrusting cup corals, plume worms, bryozoans and colonies of anemones. Incredible varieties of nudibranchs, starfish and other bottom dwelling marine animals hunt and forage for food among these living carpets.

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Because of the great distance from shore, this area is most often dived from boats. Typically, the visibility in this area is in excess of 30 feet. On relatively calm days it is a great place to dive, but because it is wide open to the prevailing northwest swells it can be treacherous during rough seas. Chase Reef lies to the north of Point Pinos at the very western edge of Monterey Bay.

The exposed coastline from Point Pinos south to Cypress Point offers a few dive spots such as **Foghorn**, **Pico** and **Lighthouse**, but these areas are hazardous in all but extremely calm seas and should only be attempted by experienced divers. This area can be fairly good for hunting when the sea is flat, but offers only fair to moderate diving for sightseers.

Monterey's well known ocean **Pinnacles** lie in the northwest tip of Carmel Bay, between three-fourths of a mile and a mile offshore. The Pinnacles are actually two submerged mountain-like formations, approximately one-quarter of a mile apart. The inner pinnacle, which rises to within 20 feet of the surface, lies in approximately 110 feet of water. Its topography is comprised of narrow canyons, sheer walls and miniature jutting peaks. The flat plateau-like top of the outer pinnacle rises to within 50 to 70 feet of the surface. Ledges extend outward from the plateau, forming huge canyons and

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valleys between the outstretched fingers.

Majestic kelp forests reach upward 100 feet, giving the underwater terrain the appearance of a giant redwood forest. Beneath the surface canopy, huge schools of rockfish move as solid walls, blocking off flickering rays of sunlight. On the bottom, *Corynactis* form soft pastel carpets, highlighted by pink and purple hydrocoral, purple and gold ringed top shells, orange cup corals, red *Tealia* anemones and yellow and blue sponges.

Here, five foot long wolf eels are often seen prowling the canyons. Large cabezon and lingcods blend with their surroundings, waiting for a careless meal to pass too close to their hiding places.

Certainly one of the outstanding dive locations in the area for photography, spearfishing and sightseeing, the Pinnacles are only accessible by boat. The run to the Pinnacles from Monterey Bay takes 45-90 minutes depending upon the boat.

Probably the best and safest way to reach the Pinnacles is to sign up on one of the local dive boat charters for a two tank dive trip.

On those days when the Pinnacles are blown out because of heavy seas and strong winds, the dive boats often duck into **Stillwater Cove**. This is an excellent place for underwater photographers to work on kelp and diver shots. The visibility is often quite good and the uneven terrain adds dramatically to silhouette and scenic shots. When there is a moderate to heavy northwest swell, the cove turns into a relatively glassy pond, lying protected behind the shelter of Pescadero Point. The only beach access to the cove is over property belonging to the Pebble Beach Corporation. Proposals for public access, guaranteed by Proposition 20 of the Coastal Act, are now being debated before the California Coastal Access Commission. Currently there is a plan awaiting final approval that would provide the public beach access with six parking spaces, an area for loading and unloading gear and restroom facilities. However, homeowners in the area are still contesting the access plan and are being represented by the County of Monterey before the commission. Therefore, until final resolution of this dispute, divers can only reach Stillwater Cove by chartered dive boat, inflatables or dive boards.

A nearby dive spot, **Copper Roof House**, is at Carmel Point. This area is in the jaws of the northwest swells and can be quite treacherous during all but optimum conditons. Copper Roof House is a dive spot for advanced divers only. Access to the area is via a stairway at the corner of Martin Street and Scenic Drive. This stairway is frequently damaged by winter storms and is usually posted as unsafe. When conditions warrant diving in this area, divers should enter the water off the wide sandy beach and swim toward the north edge of the kelp bed that surrounds the point. Schools of blue, black and olive rockfish can often be found on the outer edge of the kelp. There is a submerged reef that stretches from the point at Copper Roof, in a ragged line, to the large wash rocks on the outside of Stillwater Cove, at a fairly constant depth of 50-60 feet. Launching their dive boards at Copper Roof or Carmel River Beach, free divers follow this reef as far north as Pescadero Point. Approximately 500 yards offshore, this reef is broken by a number of sandy channels. This is a favorite spot for free divers to hunt halibut and varieties of rockfish.

Farther south is **Carmel River Beach**, a large sandy area near the mouth of Carmel River. This is another potentially dangerous location that should be visited only during calm conditions. Restroom facilities, a parking lot, easy beach entries and an interesting, jumbled rocky reef make this a popular location for divers. Here there are dense kelp forests that offer lingcod and cabezon and a variety of rockfishes for the hunters and a variety of colorful marine life for the sightseer. There is a stairway to the beach at the corner of Scenic Road and Oceanview Avenue, about 1,000 feet up the road from the entrance to the parking lot.

One of the best known beach dive locations in all of the Monterey Peninsula area is **Monastery Beach** on Highway 1, about four miles south of the intersection of Highway 1 and Highway 68. There is parking along the oceanside of Highway 1. Restroom facilities and a telephone are at the south end of the beach. The beach is closed between 11:00 pm and 7:00 am and there is a restriction against overnight parking that is frequently enforced. During periods of good weather, the diving at Monastery can be terrific

Divers should enter the water at the kelp beds at the north or south ends of the beach. The surf is generally rougher in the center of the beach and there is nothing but sandy bottom stretching from kelp bed to kelp bed. The slope of the beach is very steep at Monastery causing the surf to rise very rapidly and making the entries and exits difficult except on very calm days. When the surf is heavy at Monastery it should be avoided, even by experienced divers.

When the ocean conditions are good, Monastery can be a beautiful and exciting place to dive. When entering the water from the north end, divers should follow the edge of the kelp bed and swim out to where they want to drop down. About 75 yards from shore the bottom drops to 20-30 feet. This area is generally a little surgy, but an incredible spot for macro photography.

The head of a deep submarine canyon climbs up into the bay just beyond the largest wash rock on the outer edge of the kelp bed. The bottom drops off dramatically at this point and divers must exercise caution in keeping track of depth and time, as well as saving sufficient air to return to the beach under the kelp. It is easy to become engrossed in watching bat rays, torpedo rays or an occasional blue shark as they glide gracefully through the kelp, seemingly indifferent to the presence of divers.

The south end of Monastery is more protected than the north end and is often divable when the north end should be avoided. Here, the bottom doesn't drop

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off below 50 feet for several hundred yards offshore, but it offers excellent color and variety inside the kelp bed.

Farther out around the point to the south, in the deeper water between Monastery and Point Lobos, lies a reef which has been aptly named **Mono-Lobo**. This reef is only visited from charter dive boats or inflatables. The major attraction is a series of walls that drop from 50 to more than 100 feet. Large surface areas are completely covered with colonies of tiny pink, purple and orange *Corynactis*, orange and yellow featherduster worms, blue cobalt sponges, white spotted rose anemones, purple ringed top shells, chestnut cowries and starfish of every shape and size imaginable. In the forest of kelp rising up around the rock walls, rays, seals, mola mola and other large marine denizens wind their way through clouds of blue rockfish.

Only one mile south of Monastery Beach on Highway 1 is the entrance to **Point Lobos State Park**, an ecological reserve. The park opens at 9:00 am, seven days a week, but during summer months and on sunny weekends it is wise to get there as early as 7:00 am. The park admits a limited number of dive buddy teams on a given day. The current limit is ten buddy teams. The Park Department requires that each team have certification cards, buoyancy compensators, a dive flag and the $2 entry fee.

Road signs direct divers to a small parking lot at **Whaler's Cove**. A concrete ramp that faces perpendicularly to the mouth of the cove ensures easy access. Small inflatables and dive boards may be launched here to ferry divers to other spots inside the park. Park Department regulations restrict diving to Whaler's Cove and **Bluefish Cove**. This latter is outside the mouth of Whaler's Cove and to the left. There are restroom facilities, picnic tables and water hoses for rinsing gear at the parking lot.

Many locals think the diving at Point Lobos is the best in Monterey County. Because the marine life is protected within the boundaries of Point Lobos, the fish appear almost tame. It is not unusual to encounter large lingcod and cabezon that expect divers to yield the right of way. On most days the visibility at the park is in excess of 30 feet outside Whaler's Cove and on good days approaches 100 feet. The bottom at the park is incredibly varied, ranging from caves, tunnels and jumbled boulders inside the coves to dramatic pinnacles and walls on the outside. The depth falls to a maximum of 50 feet inside the mouth of Whaler's Cove and falls immediately to 60 or 70 feet outside of the large wash rocks. The walls and pinnacles on the outside of Bluefish Cove drop to below 100 feet.

With otters, seals and sealions dropping in unexpectedly from above and electric rays, skates and shadows from deeper water appearing along the outer walls, dives at Lobos are always beautiful and exciting. But for scuba divers who visit Monterey, Point Lobos is only one of many experiences that make this area one of the best in the world. Why not plan a vacation to come see the Monterey cypress, 17 mile Drive, the Monterey Bay Aquarium and the romantic little inns and restaurants; but this time include the best part of all—it's underwater.

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SAN DIEGO PHOTO CONTEST

The *Seventh Annual* Pacific Coast Underwater Photographic Championships will be held at Kellogg Park, La Jolla Shores, San Diego, CA, August 10-11.

The $25 entry fee includes one roll of film, which will be shot Saturday, then developed and returned early that evening at a contestants' party. Participants will choose four slides for entry in any combination of the categories and turn them in that night for judging the next morning. The results and prizes will be given at the Awards Ceremony at 10:00 am at Sumner Auditorium, La Jolla, on Sunday. All contestants will be eligible for door prizes. Special team awards will also be given—six members per team at $10 per team entry fee.

The competition categories include: diver, macro, marine life and humor. There are novice, amateur and advanced photographer divisions.

The event and registration start at 8:00 am Saturday, August 10. The film shoot takes place in the La Jolla Underwater Park until the deadline at 1:00 pm. The party starts at 6:00 pm.

For additional information and entry forms contact: chairman, Robert Melendez, c/o San Diego Council of Divers, P.O. Box 9259, San Diego, CA 92109; call (619) 566-0752 (evenings); or call publicity chairman Linda Bruton (619) 696-4325 (days) or (619) 280-0667 (evenings).

NIGHTTIME PHOTO COMPETITION

A unique underwater photo competition will be held the night of July 4 in San Diego, CA. An underwater answer to holiday fireworks, there will also be a competition for the brightest underwater light. From the surface, the area will appear to be bubbling with lights and shadows as the underwater terrain is illuminated.

For more information contact The Wet Set, 8176 Miramar Road, San Diego, California 92126.

COAST GUARD/CO

For the tenth consecutive year, United States Coast Guard personnel will receive specialized training at the College of Oceaneering. The Commercial Diving Operations Program presented by CO provides a technology transfer between the commercial diver and selected personnel from the Coast Guard engaged in the offshore oil industry.

Through exposure to the equipment and new procedures employed, the Coast Guard becomes more aware of the skills, requirements, role expectations and job functions of a diver and procedures of a commercial diving operation.

The College of Oceaneering also teaches the principles of underwater physics and physiology as they relate to the diver, safe diving practices and advantages, disadvantages and limitations of various diving systems and new developments in the industry.

The College of Oceaneering, in Wilmington on the Los Angeles Harbor, was founded in 1969. It is an accredited community college.

JOIN THE UMS

The Undersea Medical Society (UMS) is an organization of physicians, researchers and others sharing a common interest in diving physiological and medical research. Associate members receive the newsletter, Pressure, which informally describes current research and activites of UMS members, for $20 per year. Regular membership for physicians and researchers is $50 per year and includes the scientific journal, Undersea Biomedical Research. For more information write: UMS, 9650 Rockville Pike, Bethesda, MD 20814.

FREEDOM IN DEPTH

The handicapped Scuba Association—a non-profit organization that specializes in teaching scuba diving to people with physical disabilities—recently produced its own 20 minute documentary, *Freedom in Depth*. The film, hosted by Jean-Michel Cousteau and starring 19 handicapped divers, dramatically depicts what the HSA has been accomplishing for the past ten years: bringing the self-image enhancing benefits of sport diving into the lives of



paraplegics, quadraplegics, even the blind. Says Jim Gatacre, HSA program director, "Because water permits three-dimensional movement in a gravity-free environment, diving is an ideal sport for people with impaired mobility on land."

Funded almost entirely by the Diving Equipment Manufacturers Association (DEMA) and Professional Association of Diving Instructors (PADI), the film is an upbeat, action-packed adventure destined to inspire novice divers, challenge experienced ones and entertain us all.

Freedom In Depth is available in two formats: VHS/BETA for $50 or 16 mm film for $245. Purchase yours directly from the HSA, 1140 El Prado, San Clemente, CA 92672.

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Temple University Underwater Medicine

The 15th Annual Underwater Medicine program sponsored by Temple University School of Medicine and by the Undersea Medical Society will be held January 11-18, 1986, at the Flamingo Beach Hotel in Bonaire, one of the Netherland Antilles. The program which covers topics in diving and hyperbaric medicine and exercise physiology is directed by Dr. Alfred A. Bove, Medical Director for the National Association of Underwater Instructors, medical editor of Skin Diver Magazine and an authority on diving and environmental medicine and exercise physiology. The course is arranged to allow time for scuba diving and provides 26 category I CME credits.

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INSTRUCTION AID COMPETITION

BY DENNIS GRAVER

Professional dive instructors realize the value of training aids in reinforcing key points, increasing retention and saving time. To share these ideas and improve diving instruction, to recognize excellence in the development of training aids and to encourage the development of new ideas, NAUI is sponsoring instructional competition with the area of training aids being featured for 1985.

As a further incentive for participation, awards and prizes will be presented to the winners in each category. Also, the winning entries will be published by NAUI. Finally, winners may have the opportunity to profit from their contributions by receiving a royalty on an idea accepted and marketed by the association.

The competition is open to instructors of all diving certification agencies. A panel of noted educators will be selected by NAUI Headquarters to judge the competition. Nominations for competition judges are open until November 1. Nominees must be attendees at the International Conference on Underwater Education (IQ85) in San Diego, California November 21-23. Pre-judging will take place just before IQ and the final judging will occur at the conference November 22. Winners will be announced at the conference and presented with the awards and prizes.

Eleven categories have been designated and aids for each are to apply to entry level scuba instruction. The various categories and a brief description of each are listed below:

1. Best single color slide—one 35 mm slide reinforcing the key points for a single topic.

2. Best color slide series—a series of slides not exceeding 40 in number and pertaining to a single topic.

3. Best single high contrast slide—one high contrast (e.g., Kodalith Ortho Film 6556, Type 3) 35 mm slide reinforcing the key points for a single topic. Color may be added manually.

4. Best high contrast slide series—a series of high contrast 35 mm slides not exceeding 40 in number and pertaining to a single topic. Slides may be manually colored.

5. Best overhead transparency—a transparency for an overhead projector and pertaining to a single topic. May consist of overlays, moving parts, etc.

6. Best video—a video tape not exceeding five minutes in duration and pertaining to a single topic—format to be VHS or BETA.

7. Best audio cassette—a standard audio cassette tape not exceeding five minutes in duration and pertaining to a single topic. May be presented in combination with a slide series entry as an audio/visual combined entry.

8. Best diagram/chart—a poster or chart of approximately 20 by 25 inches, pertaining to a single topic. Cutouts and attachments are permitted. To be displayed on an easel.

9. Best exhibit/model—a demonstration or exhibit of a three dimensional nature used to reinforce a key point on a single topic. An example is a Cartesian diver.

10. Best use of chalkboard/whiteboard—illustrations, outline or other use of a chalkboard or whiteboard to present information on a single topic. A photo or illustration of the presentation is acceptable for the entry.

11. Best pool training aid—a training aid used in or underwater in a swimming pool to help develop a single skill. A photo or illustration of the aid is acceptable for the entry.

HOW TO ENTER

If possible, send the actual aid or a duplication of it to NAUI Headquarters, 4650 Arrow Hwy., Suite F-1, Montclair, CA 91763—Attention: Scuba Instruction Competion. Include a return address label as well as a one page statement of the purpose of the aid and how it is to be used. The statement should have a title and a byline, be typewritten and double spaced. Contestants may place entries in as many categories as desired. NAUI will take every reasonable precaution in caring for the aids, but will not accept responsibility for loss or damage. Commercially produced aids are not eligible, nor are copyrighted concepts.

Judging will be based on originality, reinforcement of key points, safety, quality, simplicity and effective use of time. Entries need not be new ideas, but note that originality is one of the principle criteria for determining the winning entry.

WRECK DIVE VERIFICATION

Wreck Dive Verification certificates will now be offered to all scuba divers participating in wreck dives with boats that are members of the Eastern Dive Boat Association.

More than half of all of the commercial dive boats in the New York-New Jersey Bight area—17—belong to the association.

Capt. Richard Ziminski, president of the group, said the certificates will be an aid to any facility wishing to know the diver's capabilities.

Anyone interested in obtaining literature from the association for membership or charter purposes may write to the Eastern Dive Boat Association, c/o Capt. Richard Ziminski, 29 Colonial Terrace, Colts Neck, NJ 07722; (201) 727-8333.

DIVING MEDICINE

(Continued from Page 14)

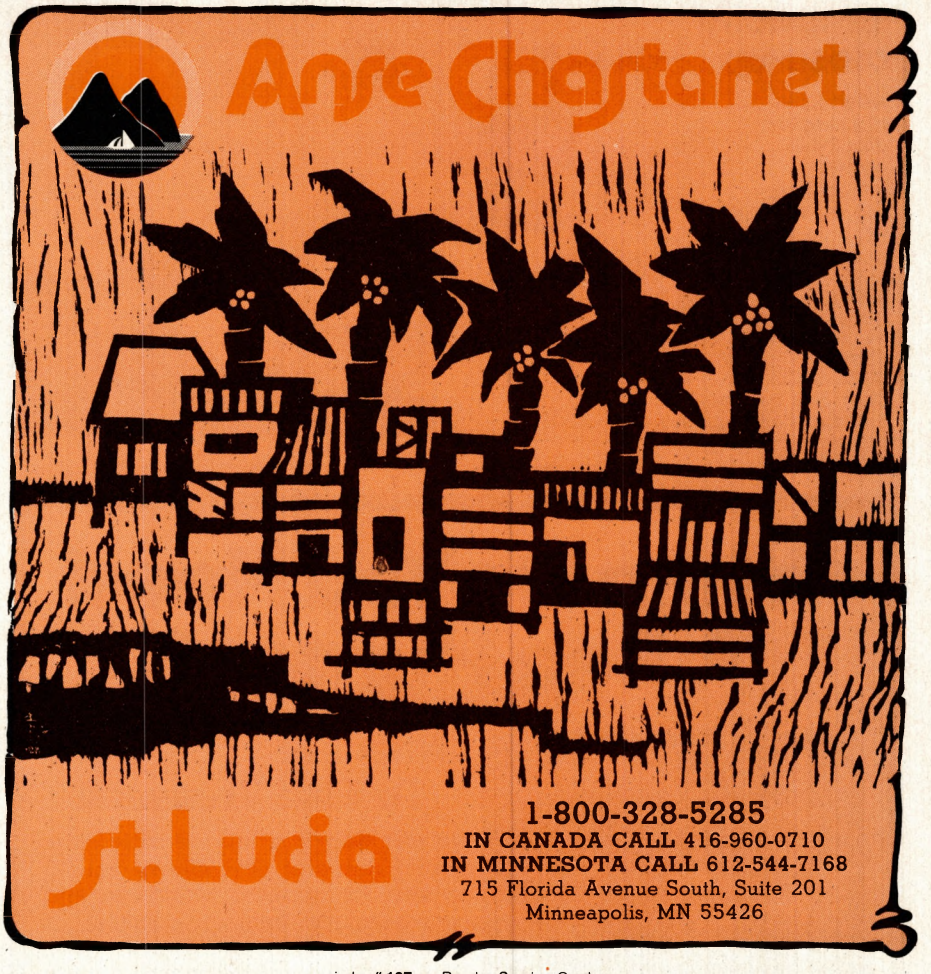
member that we are not all equally limber, nor are we likely to be just as flexible today as we were yesterday. Stretch only until it feels right. Anything beyond that will be worse for you than not stretching at all. A good guide to all around stretching, *Stretching*, by Bob Anderson (Shelter Publications, P.O. Box 279, Bolinas, CA 94924, 1980) is available in paperback, is complete and easy to follow.

Lashing 30-40 pounds on your waist and swimming horizontally is a spine cruncher. A drysuit, with the extra buoyancy in the legs and feet, aggravates the tilt in your spine that the weightbelt produces and further compresses your intervertebral discs. If you have back problems, distributing your diving weights will help alleviate the pressure on your back. Ten to 20 pounds can be moved to your tank with minimum effort and minimum inconvenience. The amount of weight you move to the tank depends upon how your back feels and how much you want to work moving or lifting the tank.



Further reduction in disc compression can be accomplished with a pair of ankle weights. Quilt one to three pounds per weight of lead shot into some durable parka material, sew on Velcro® patches, and you've made a serviceable pair of weights. Ankle weights can also be purchased at dive stores. Home-made or store bought, they work to keep your legs down and to straighten your spine.

Proper lifting, stretching before and after a dive, and redistribution of your weights can be keys to reduced back pain and reduced back problems. Most of us don't like to think about these things; fewer like to trouble themselves with seemingly unnecessary precautions. Still, minimal care can keep you in the water instead of home while your companions are enjoying a dive.



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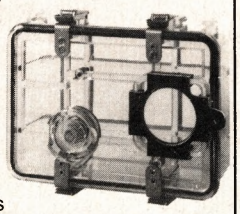
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For information on these events and NAUI DIVES HAWAII, (Nov. 14-20) and for reservations, please contact Westaire Campus Travel, (800) 682-4200 U.S.A. or (800) 221-7135 Calif.

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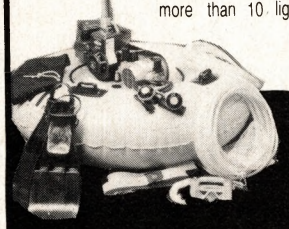
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Divers Unlimited Treasure Hunt

BY COLLEEN GILCHRIST

All of us have daydreamed of surfacing from the water waving a valuable treasure we had just plucked from the ocean floor. Well, Divers Unlimited of Hollywood and Fort Lauderdale, Florida is about to make that dream a reality with its Tenth Annual Free Treasure Hunt on Sunday, July 21. Imagine the excitement of winning prizes just for going diving! Treasure Hunt Ten will be the social event of the year for South Florida divers. Three thousand are expected.

Over $10,000 in prizes will be given away including tanks, regulators, BCs, wetsuits, masks, fins, snorkels, T-shirts, air fill cards, training courses and exotic dive vacations.

All certified divers are eligible and invited to participate. DU's past Treasure Hunts have been so successful and so much fun that divers have come from as far as California, New York and Alaska.

The rules for Treasure Hunt Ten are simple: Each entrant must be a certified diver with a buddy, buoyancy compensator and submersible pressure gauge. Each buddy team must carry a dive flag and teams are limited to three divers.

As usual, there is no entry fee for the Treasure Hunt. Participation is absolutely free. However, all participants must preregister prior to the day of the Hunt at the Hollywood Divers Unlimited store. You must bring your certification card. Any prize winner who is not pre-registered will be automatically disqualified. Upon preregistering, all participants will be furnished with a map showing the exact location of the Hunt.

On the day of the Treasure Hunt, registrants should show up at the check-in table on site between 9:00 and 9:45 am. This is done to facilitate logging divers in and out of the water during the hunt. At that time, participants may also ogle all of the prizes arrayed around the check-in table and start to dream about the one that might soon be theirs.

At 9:45 am, the captain and crew of the *Diversion* will cruise the waters off the beach and throw hundreds of "doubloons" overboard. Each is marked with a number corresponding to a prize. At exactly 10:00 am the *Diversion* will sound its horn, signaling the start of the event. Prospective winners have two hours to search for the numbered doubloons.

Only one prize per diver is allowed, so if you spot two doubloons, leave one there for your fellow diver. Prizes are not matched consecutively to the numbered doubloons, so part of the fun after the hunt is not knowing who won the big prizes until the numbers are called. All prizes will be awarded on the beach immediately after the hunt.

Bring your family and friends to watch you become a pirate for a day, capturing riches from the sea. Swashbuckling swords and eye-patches are allowed, as are Frisbees, footballs and volleyballs for a leisurely day on the beach after your fun-filled morning. Come join Divers Unlimited for a day of fun and sun, a chance to meet new diving buddies and the reward of treasures from the sea. Call Divers Unlimited at (305) 981-0156 for further information.

GREENSTONE NOMINATIONS

NAUI is soliciting nominations for the 1985 Leonard Greenstone Diving Safety Award. The award was developed and designed to encourage contributions toward safety in all aspects of diving. It is administered by NAUI, but is not a program of the association.

The Greenstone Award Committee endeavors to present the award annually to a recipient fulfilling the established criteria. A minimum of $500 is conferred and there is a perpetual trophy.

The Greenstone Award is intended to encourage development of all forms of safety programs, equipment and devices. This award has, as an overall objective, the total elimination of injuries or loss of life, relating to underwater activities.

The Leonard Greenstone Diving Safety Award is open to all persons throughout the world, regardless of their organizational affiliation.

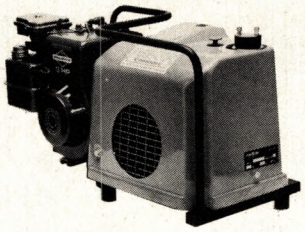
To submit a nomination, contact: Greenstone Committee, NAUI Headquarters, P.O. Box 14650, Montclair, CA 91763.

WISCONSIN DIVE STORE

Divemaster Scuba Center, a new full service PADI Training Center, has been opened in Wisconsin by PADI master instructor Fred Frommelt. The store, at 2779 W. Ramsey, Greenfield, WI, offers sales, service and rentals, trips, air and a full schedule of classes from open water to master scuba diver, including 14 specialty courses.

Also offered by the store are Lake Michigan dive trips to all the local wrecks aboard the *Divemaster*. Owned by Divemaster Scuba, the vessel is a 43 foot, steel hulled, twin engine boat. It is U.S. Coast Guard approved and equipped to handle 24 divers. She is captained by Frommelt who is Coast Guard licensed for vessels up to 100 tons on all the Great Lakes and the Atlantic Ocean.

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* STOP WATCH
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SDM travel SECTION

THE ISLAND FANTASY

Luxury Dive Cruiser

TEXT AND PHOTOGRAPHY BY STEVE LUCAS







She is a floating fantasy. From the moment she was conceived, many thought her too adventurous, too bold, too grand. But captains Frank and Dee Hammett knew their well planned dream of the most luxurious dive yacht afloat would become a reality. Today, 90 feet of gleaming mini-cruise ship, she sails regularly across the blue Gulf Stream from Florida's east coast to the turquoise of the Bahama Islands.

Built by Lydia Yachts and christened the *Island Fantasy*, she is far from being just another dive boat. "A smaller version of the love boat," her captains like to call her and they intend to justify their claim. Although casual is the norm, the vessel has a great deal of class. Each crew member wears a uniform similar to those found on large ocean cruise ships. Dress blues await you at the dock, throughout the cruise crew members wear their sea-going whites. Each person has specific duties, is well trained, very friendly and highly qualified.

In the forward portion of the roomy saloon, your feet sink into the rich pile of thick, newly laid carpet. Around you there is the warmth of handcrafted teak, wood paneling, decorator drapes and wall coverings.

The cuisine is prepared by a trained chef. Evening meals are served with wine at your candlelighted table while you and your friends are seated in thickly padded booths. Additionally, fruit platters, nuts, finger foods and cheeses are placed out at various times during the cruise.

After diving hours, a licensed bartender prepares your favorite tropical concoction from a fully stocked bar. You can relax on the 31 foot color coordinated couch that surrounds the game room/saloon lounge or climb to the upper sun deck/dance floor and let the sea, moon and stars entertain you. If you choose, you can retire to the forward video room and amuse yourself with a selection of recent-release movies, listen to a variety of tapes or select a book from the library.

Sleeping accommodations are as above average as the rest of the yacht. Designed as a comfortable refuge, each paneled, semi-private cabin has two large double berths, carpeting, plenty of closet storage, piped in music and a private head and shower.

Based at Riviera Beach, just north of West Palm Beach, the *Island Fantasy* makes week long cruises to a range of islands including Grand Bahama, New Providence, the Abacos, Berry Islands, Andros, Bimini, Cat Cay and others. A typical itinerary may lead you to port calls in Freeport and Nassau, as well as many small, hidden harbors.

At major ports, time is always allotted for shore leave and shopping. In Freeport, you can spend a dressy evening in the casinos or spend an af-

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ISLAND FANTASY

ternoon wandering through the varied shopping worlds of the International Bazaar. At Nassau, there is time to visit the straw market and stroll through many of the waterfront shops that sell cameras, jewelry and island T-shirts. In smaller ports you have time to sample fresh, spicy conch fritters, hot grouper fingers or freshly baked bread at one of several open air food vendors. At Bimini, you can lift a glass at the Compleat Angler, where Ernest Hemingway wrote his novel, *Old Man and the Sea*, or tap your toes while an island band plays rock and roll with calypso flair.

Diving from the *Island Fantasy* is a combination of most everything you have



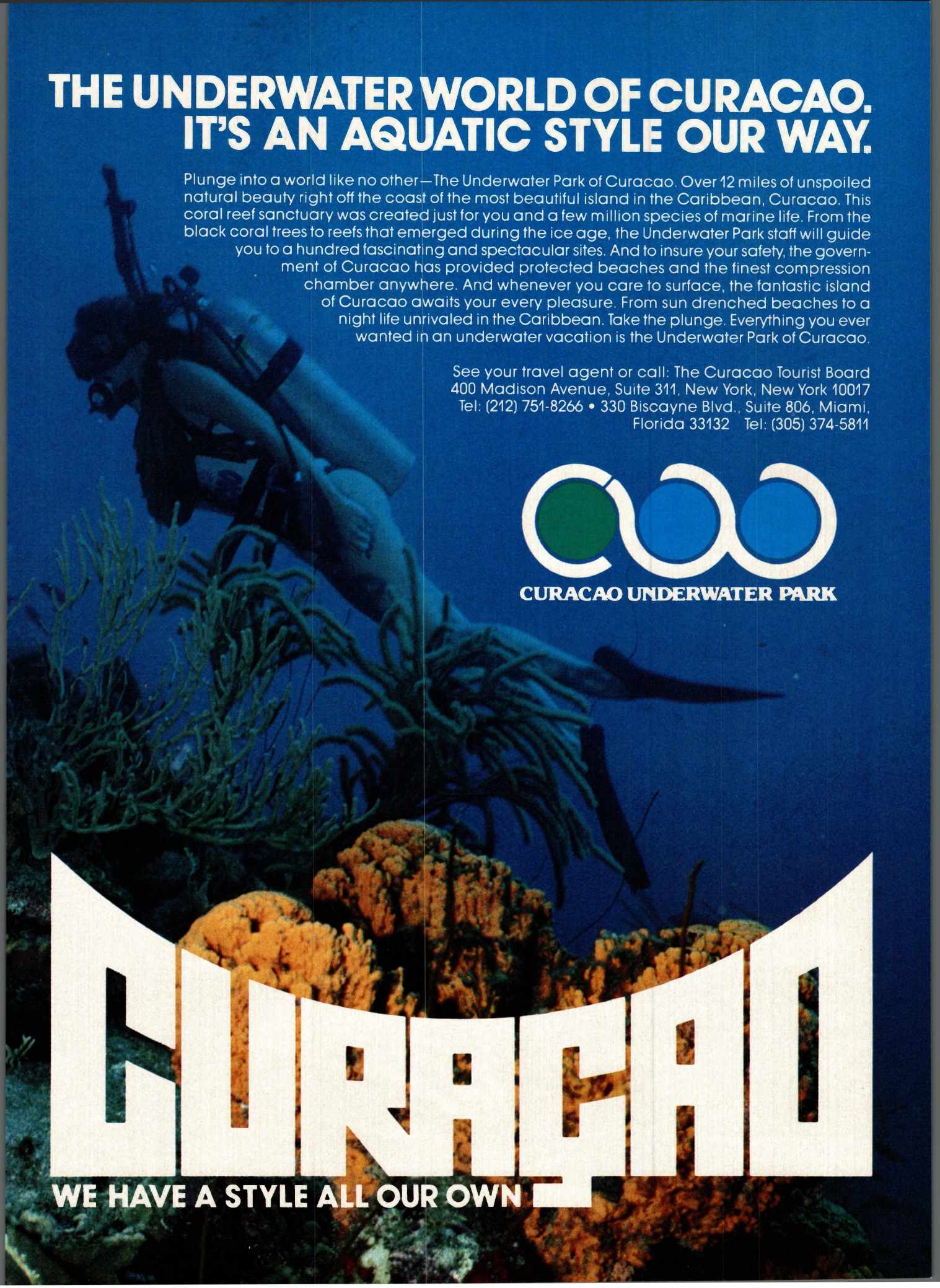
ever read about the Bahamas. She visits reefs and wrecks everywhere along the cruise, with an unlimited dive schedule at each anchorage.

Near Grand Bahama, the deep wall drops from 130 to well over 2,000 feet with dizzying abruptness. Inshore the reefs run in ridges with depths ranging from 10 to 80 feet. All have good populations of sea life and an abundance of tiny macro organisms. On the edge of the drop-off sits a 230 foot freighter, purposely sunk as an artificial reef. At 110 feet, Theo's Wreck is a magnificent backdrop for photographers.

East of the island, Frank and Dee have located a pod of wild spotted dolphins that allow divers and snorkelers to swim in their midst. Written about in several magazines, including SDM, the pod of up to several dozen cetaceans shows little fear and individuals come quite close, turning away only when an overly curious diver tries to touch them.

Close to Nassau, on the south side of New Providence, the diving is even more dramatic. In an area where underwater sequences for several James Bond epi-

(Continued on Page 90)


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Bimini is right on the three-knot Gulf Stream. A haven for drift and wall divers.

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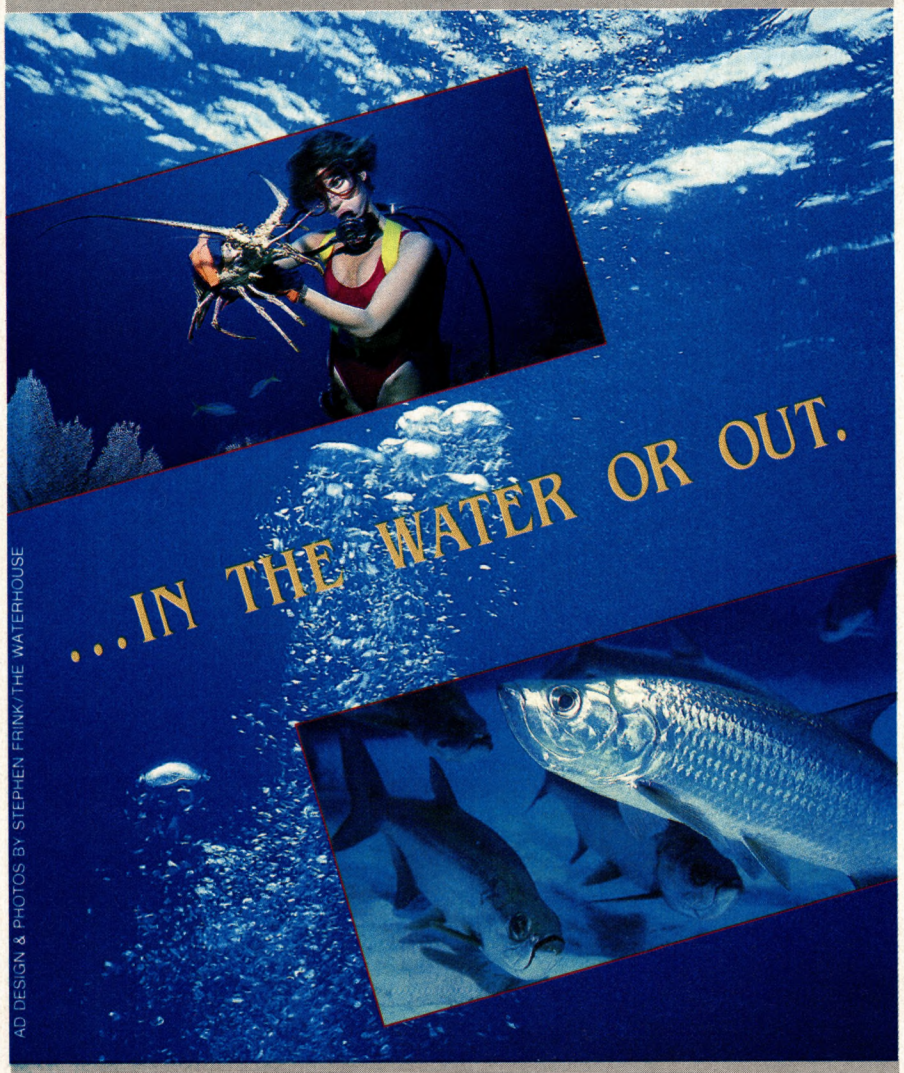
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ISLAND FANTASY

(Continued from Page 86)

sodes have been filmed, the wall drops quickly from 60 feet to depths where only a submarine could go. Purple tube sponges proliferate and decorate the underwater cliff as large fish swim out on the edge of your visibility. Toward the island the water becomes shallow quickly. Large formations of massive corals, branching elkhorn, staghorn and others grow in enormous, tightly fused clumps.

In the Berry Islands, plateaus of snowy sand cover thousands of square miles. Hundreds of isolated coral colonies are scattered throughout. In an area known



as the Gingerbreads, large coralline conglomerates rise 20 to 30 feet from the 60 foot depths. In several shallow regions, old galleons have been uncovered, their ballast in water barely 20 feet deep.

At Bimini there is a long line of reefs in depths averaging 60 feet, while a deep wall drops from 110 feet into the abyss. To the south, an old concrete wreck, the *Sapona*, stands with her deck out of water. Inside, thousands of glassy minnows swarm through her shattered ribs and schooling fish swirl around her prop.

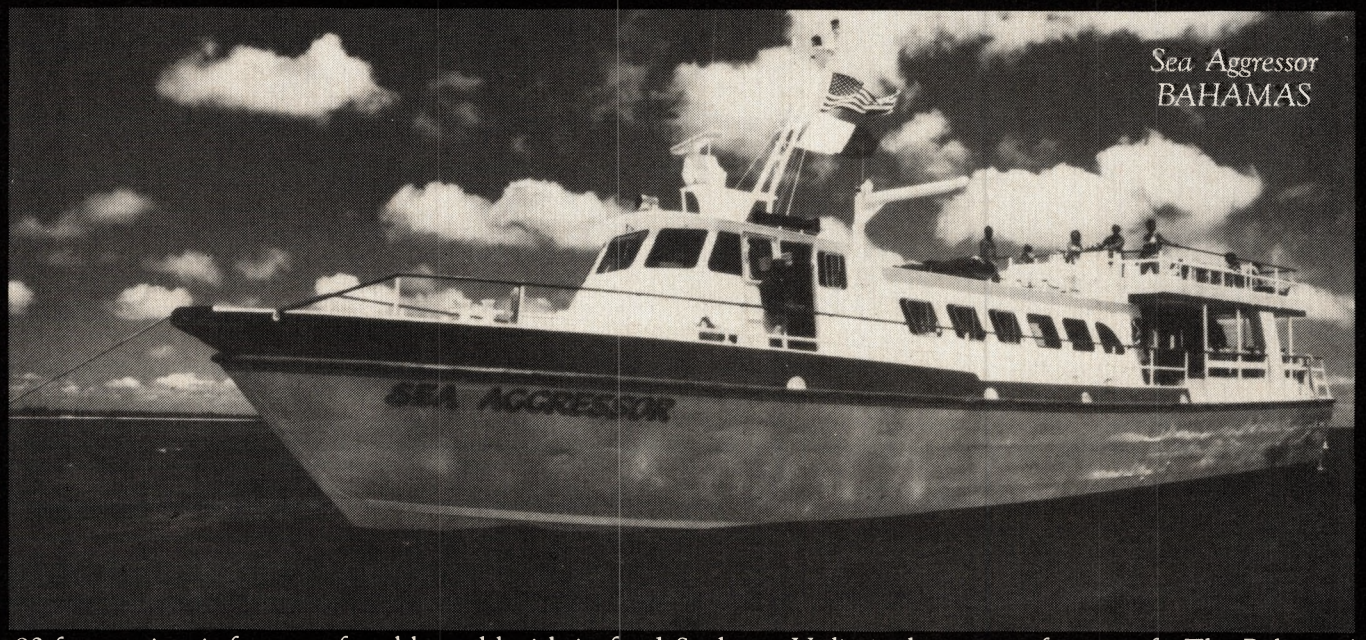
Twenty miles to the south the Victories give you an opportunity to swim through hundreds of open ended caverns, all completely overgrown with reddish brown sponge coverings. One of the best diving areas in the Bahamas, the water is almost always clear owing to the fast flowing Gulf Stream.

If all of this sounds like a fantasy you may have had, it can soon be your reality. The *Island Fantasy* is capable of making almost anyone's Bahama vacation vision real. A color brochure is available with lots more details, as well as dates for many upcoming cruises. For a copy write Captains Frank and Dee Hammett, *Island Fantasy*, 301 East Blue Heron Blvd., Riviera Beach, FL 33404; (305) 848-7632. If you call and request a copy before August 31 your name will automatically be entered in a drawing with a cruise for two as grand prize. Whether you win or not, the *Island Fantasy* is ready to make your island fantasy come true!

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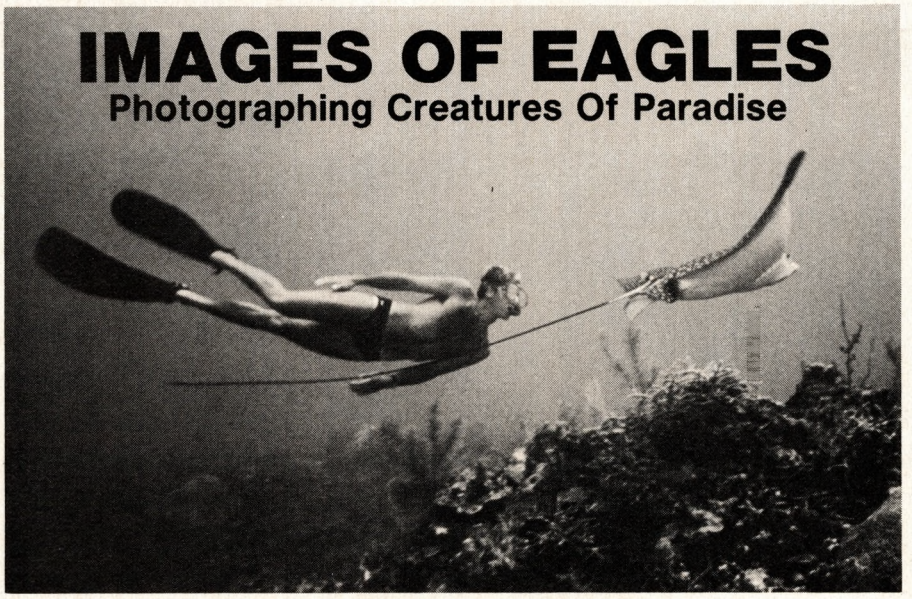
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IMAGES OF EAGLES

Photographing Creatures Of Paradise



TEXT AND PHOTOGRAPHY BY DICKIE WALLS AND PHYLLIS CATHEY

The eagle ray is a creature of paradise. It glides through its fluid abode with the grace of its feathered counterpart, enjoying a life of freedom and harmony. I have observed eagle rays in "flight" for many years and have thought that if reincarnation were possible, no better reward could be offered than to glide along the wall among these perpetually smiling spirits. For now, I swim with the rays when I can (and as they will let me) capturing their grace and spirit on film.

Photographing eagle rays is a challenge which requires patience, skill and, above all, the cooperation of the ray. Eagle rays tend to be cautiously curious and display a moody intelligence for when to approach man in the sea. To gain the trust of an eagle ray is to become one with the gentle spirit of the animal and there is no better way to photograph it.

The best photographic opportunities I've found for eagle rays are along the tops of sheer walls. I have dived extensively with rays on the North Wall of Grand Cayman, where it crests in 45-60 feet of water and descends vertically to 6,000 feet. Eagle rays cruise the edge of the wall, sometimes as singles or pairs and sometimes in gangs.

There is a playful spirit within the eagle ray that occasionally causes it to leap with delight, sometimes 10 feet above the sea. I have had eagle rays swim tight circles around me and do loops and rolls for my entertainment and I have seen eagle rays turn tail and flee at first sighting. When the ray is uneasy about a diver, there will be no cooperation where photography is concerned.

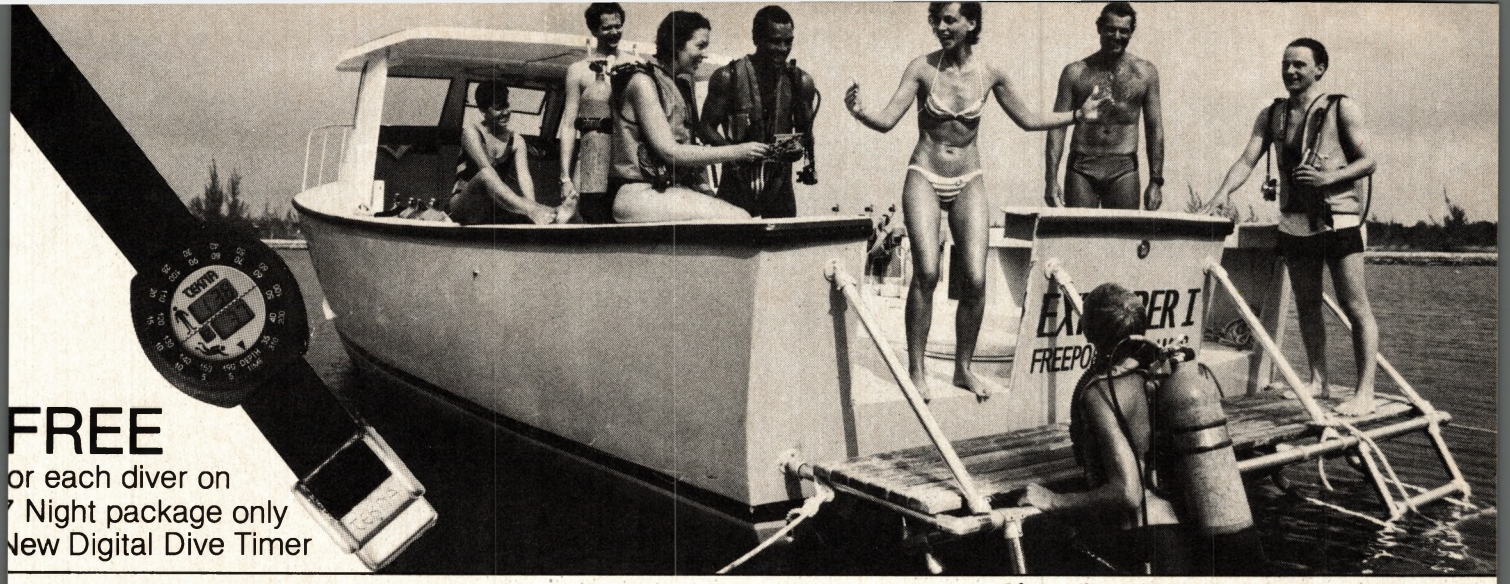
From the eagle ray's perspective, divers are alien beasts of bubbles, noise and frantic motion and all these things are disquieting to the animals. For ideal photographic opportunities on scuba, a buddy team effort is best. Make sure your buddy is aware of your needs and willing to put up with them. It is better if your buddy is a non-photographer who can help you locate and get close to the rays instead of running them off. It is best if your buddy is a skilled underwater model who can contribute to the effect of your photographs by adding human presence.

Photographing eagle rays with a model requires a great deal of communication, cooperation, good timing and luck. An enlightened model who has a good understanding of the eagle ray and its hab-

(Continued on Page 98)



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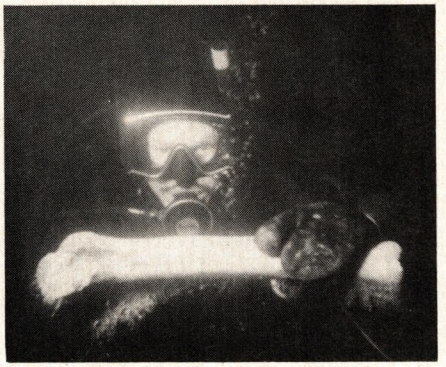
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MISSOURI RIVER

(Continued from Page 63)

The air temperature is still only 25°F and before we reach the boat dock our drysuits are covered with white, flaky ice crystals. Each time we bend our arms it looks as if we have snow falling from our elbows. Many people will never know what it's like in the underwater world of the Missouri River, for you truly have to experience it first hand. It is surely another world, in this case a cold, swift moving world where man is only a visitor and a short term visitor at that.



With a population of 600,000, North Dakota may never become a diving mecca, but who cares as long as we know—the Missouri River, North Dakota's best kept diving secret.

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Port Largo Resort has donated a smoked glass sided houseboat to the Marine Resources Development Center on Transylvania Avenue in Key Largo. The unusual houseboat is built on two large cylindrical pontoons and has ample living space, including two bedrooms, and all the conveniences of a modern home or office.

The Marine Resources Development Center will use the Port Largo Resort gift to accommodate visiting scientists and marine scholars who will be conducting research at the center.

DOLPHIN RESEARCH

Friends of the Sea, a non-profit foundation, is looking for support from people who are interested in dolphin research. Needed are working volunteers and people to help support sea trips and be part of the team. Also needed are sponsors and donations for equipment. The Friends will take any equipment that may be used or fixed up for resale. Donations are tax-deductible. Brochures are available for those who are interested. Write or call: 19165 Waterway Rd., Tequesta, FL 33458; (305) 747-3416.

NAUI COLLEGE

The 1985-86 NAUI College brochure is now available. The booklet contains information on the ten week professional instructor course, one and two week ITCs, divemaster and rescue courses and specialty instructor courses. Included are dates, locations, cost, curriculum, textbooks, housing, equipment, prerequisites and application procedures. The catalog is free and will be promptly shipped to any U.S. or international address.

BELIZE DOLPHIN RESCUE

A mother and baby dolphin were recently rescued from a fish trap off Ambergris Caye, Belize. Suffering the effects of what is assumed to be at least a two day entrapment, the animals were hand lifted out of the trap, placed in a skiff and transported two miles to a natural aquarium behind the Tackle Box Pub in San Pedro.

In the aquarium, which also held sharks, turtles, tarpon, jacks and a grouper, the mother protected and nursed her baby while teaching it how to catch live fish. Both animals soon regained their strength and were then released into open Caribbean waters.

MICHIGAN CHAMBER

Scuba divers in Michigan waters will soon have better access to emergency medical treatment thanks to a federal grant just awarded to the Alpena County General Hospital. The hospital will receive $26,968 to reactivate its recompression chamber so recreational divers may have access to necessary treatment in Michigan in case of a diving accident. The chamber can also be used to treat research and commercial divers and tunnel workers.

COASTAL U/W VEHICLE COURSE

A new advanced course in underwater vehicle pilotage, instituted to meet industry demand for trained specialists, is being offered for the first time by Coastal School of Deep Sea Diving, Oakland, California. Open to all graduates of Coastal's Basic Air Course, the school will award a wet pilot's certificate to students upon successful completion of the one month course.

According to Captain A.A. Mikalow, school director, "Students will receive training with the one-atmosphere diving suit, dry and wet submersibles and the underwater remote vehicle (ROV)." The school will use a unique new mini-ROV, designed by Captain Mikalow, as a supplement to the course.

A limit of 12 students per class has been set in order to provide individual instruction and attention to safety procedures. Tentatively, the course will be offered every three months.

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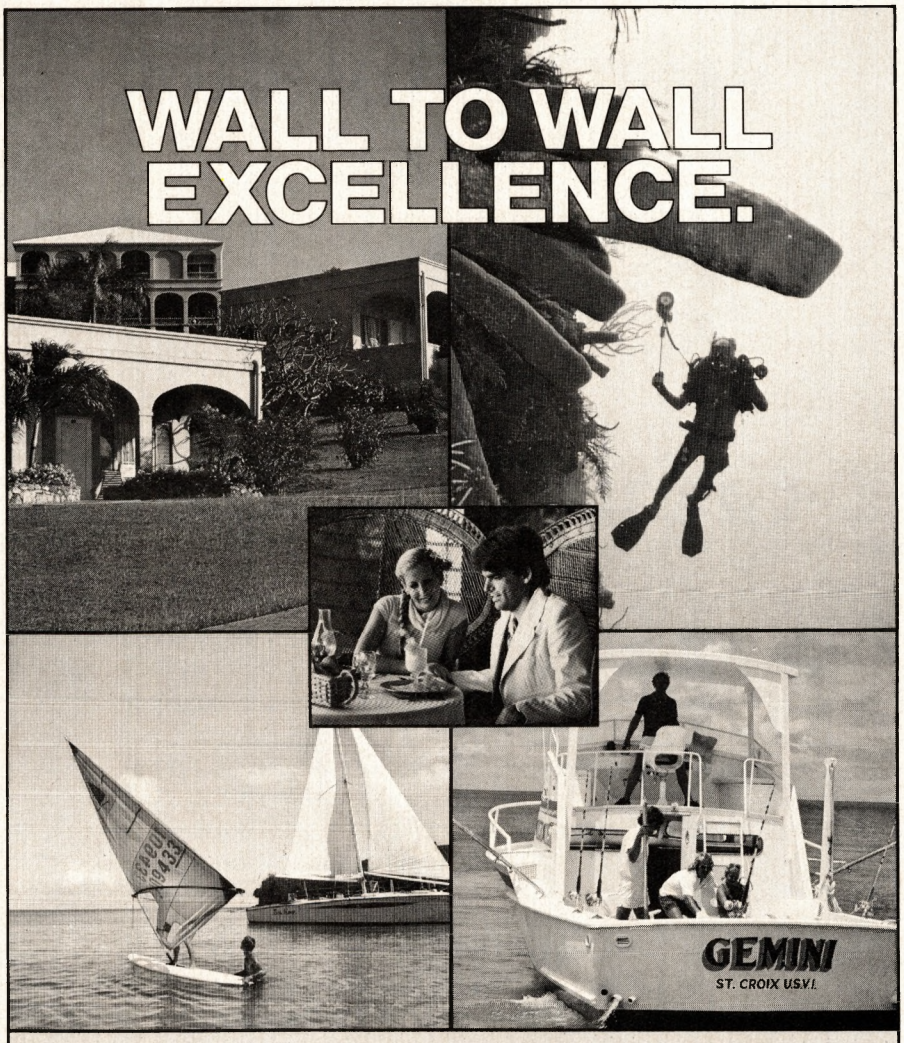
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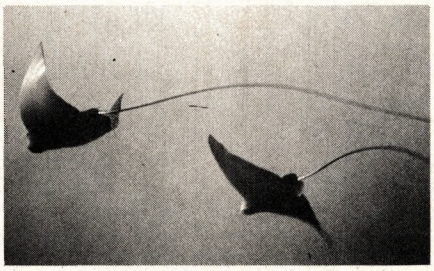
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IMAGES OF EAGLES

(Continued from Page 92)

its can observe the swimming pattern of the ray and determine her/his best position for a photograph. The model must be aware of the photographer's position and chances of intercepting an eagle ray and make a decision as to whether to divert the ray toward the photographer, swim with the ray, or get out of the way.



Efficient silent communications are essential if the needs of the photographer and the abilities of the model are to combine. Banging the tank is an excellent way to offend the sensibilities of the ray and send it flying. If the photographer feels he/she has a better chance of photographing the ray alone he/she may move ahead knowing the model will make a wide intercepting circle, moving into the ray's path further along. The model must observe the behavior of the ray and determine whether a second human presence will be accepted. If the model can move in from the side opposite the photographer, both may close slowly with the ray and see how long it will cope. As the ray is sandwiched in, it may be subject to an anxiety attack. If model and photographer remain calm, move smoothly and maintain a peaceful attitude, cooperation is the reward. Diver overexertion, heavy breathing and spastic movements will cause the ray to turn on the after burner. If the model/photographer team is successful they'll get a photograph with the eagle ray in the foreground and the model behind. If they are not so lucky, they'll get the rear end of the model in the foreground and the fleeing ray in the distance.

While swimming alongside the ray, the model must be simultaneously monitoring the ray and the photographer, attempting to be in an aesthetic position when the photographer has a chance to shoot. The model should swim with arms by his/her sides, body slightly angled toward the photographer and legs straight. Swimming a bit above the ray will place the full body of the model in silhouette for a more pleasing composition.

Mobility is essential in eagle ray photography and I prefer the Nikonos camera system because it is smaller and more maneuverable than a housed camera. A 28 mm lens is the best lens for beginning ray photographers because it al-

lows longer distance formatting with acceptable debth of field. I prefer to use the Nikonos 15 mm lens because it produces the sharpest image, but it also requires a minimal subject distance. The wider the angle of the lens, the clearer the photograph, the better the strobe coverage and the closer the photographer must be to the ray. When you become more intimate with an eagle ray, you're ready for super wide angle.

Preparation is crucial for photographing rays. Exposure data should be assessed and camera and strobe adjusted during descent so when the ray appears you can concentrate on format, angle and range instead of f stop and strobe power. Remember to make exposure calculations for every angle of approach the ray may select and be ready for rapid adjustment if the eagle ray swims upward toward the sunlight or downward into deep blue water.

To properly light rays with a strobe, determine what strobe exposure will match the metered available light and use subject distance to vary strobe exposure. If the ray allows a very close approach be certain that the strobe is not too bright. To reduce the effect of the strobe, hold it farther from the subject. When the strobe is going to be ineffective because the ray is beyond range, turn off the strobe, turn it away, or put it directly against your leg to prevent photographing useless light. To prevent backscatter I extend the strobe an arm's length to the side.

Deep on the wall, water is often clear enough to use full strobe power with maximum aperture (f2.8) with negligible backscatter. This can give a 150 watt strobe an effective range of 15 to 20 feet. If silt is visible in the water, use the strobe only when at close range. Even minor amounts of backscatter can mar a deep wall shot. In the dim light of deeper waters a slow shutter speed (1/30 second) is often needed for adequate exposure. It is especially important to prevent camera motion when shooting at slow shutter speeds. I use 100 ASA film, though for many purposes a faster film (ASA 400) is superior since it allows greater depth of field and faster shutter speeds.

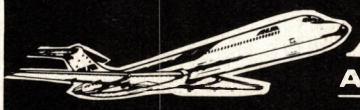
Rays are best approached by a casual interception. The uncontainable excitement of sighting an approaching ray should be directed toward plotting a parallel course and considering where to close in for the best possible shot. An angle which will include a model, or the wall, adds action to the shot, but be careful to catch the ray in midwater with no reef behind it. The spotted upper surface of the ray blends perfectly into the reef.

You'll find that maintaining the cruising speed of a big ray demands full swimming force. After getting profile shots, let the ray out run you, then move over its tail and pace it. Rays feel secure when you are behind them and if you ever see one take off at full speed you'll understand

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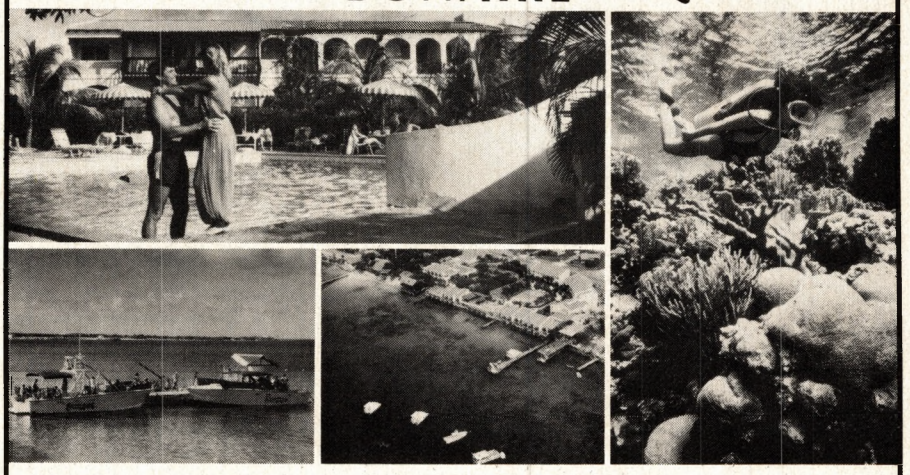
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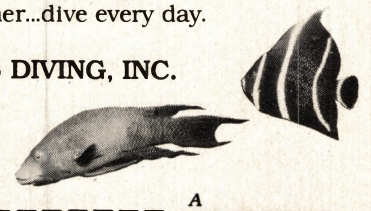
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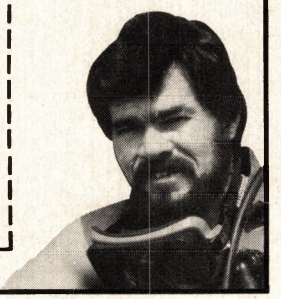
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IMAGES OF EAGLES

why. Rays in pairs seem friskier and more agreeable to humans, but also tend to maintain a greater distance than singles. When photographing pairs, they will often split up and circle about. While photographing one, keep track of the other. Sometimes the mate will approach you very closely from behind while you are concentrating on the other.

For a head on shot, luck and craftiness are needed. Eagle rays tend to continue on the course they were following when first sighted. If a ray can be intercepted from behind a coral abutment, sometimes a nose to nose encounter is possible. Even if a ray is frightened back the way it came, it will usually circle back and continue along its chosen course. If the photographer can anticipate that course and move into the ray's alternate path, sometimes it will swim right to him. Bubbles are often a giveaway to a waiting diver, so try to keep exhalations gentle. There is usually very little time between looking the ray in the eye and looking the ray in the tail, so make good use of it.

The ultimate way to get eagle ray photographs is to free dive. Eagle rays show little fear of a free diver and will go out of their way to have a closer look. By free diving down around 60 feet, I've had eagle rays ascend from 100 feet or more to swim with me. Free diving with eagle rays should only be done in the company of a competent buddy. The extra bulk of a camera system and the excitement of having an eagle ray circling about leaves a real prospect for shallow water blackout. Always be sure you alternate dives with your buddy and be very cautious about excess hyperventilation. When free diving, pre-setting cameras is essential. For beginners, available light is recommended. The drag of a large strobe will increase dramatically as you rush toward the surface for a breath. Camera and strobe should be held at your side at arm's length so drag is minimized.

Eagle ray photography is an engrossing pastime with potential hazards. Rays sometimes swim downward when they encounter a diver and a photographer is often focused through a viewfinder, not on depth and pressure gauges. There are depths to which a photograph is not worth going. Breath holding with scuba at depth to prevent bubbles can cause CO_2 build up, oxygen deficiency or even embolism and should be avoided. Free diving hazards include shallow water blackout and cramps. The strain of snorkeling deep is exhausting and can result in an oxygen debt. Remember to spend more time on the surface between dives than you spend below. This is especially hard

to remember when an eagle ray is swimming circles beneath you. Never attach photographic equipment so it can't be dropped in an emergency. Choose a free diving buddy you can bet your life on and make sure your boat is close by. Be cautious, otherwise you might never get to see the great pictures you took.

Preparation, patience, determination and stamina will all be for naught if the eagle ray doesn't cooperate. To gain cooperation requires smooth motion, careful movements and the right attitude. Send out your thoughts to the ray, let it know your intentions are harmless and maybe it will tolerate your company. When an eagle ray accepts you as a desirable companion, you may experience the joy that keeps the perpetual smile on the face of the ray. There is a radiance of good humor, a frolicking enjoyment of life, in the being of the eagle ray that makes seeing one the highlight of almost any dive. I have found no photographic thrill to equal snapping the shutter on the smiling contenance of an eagle ray.

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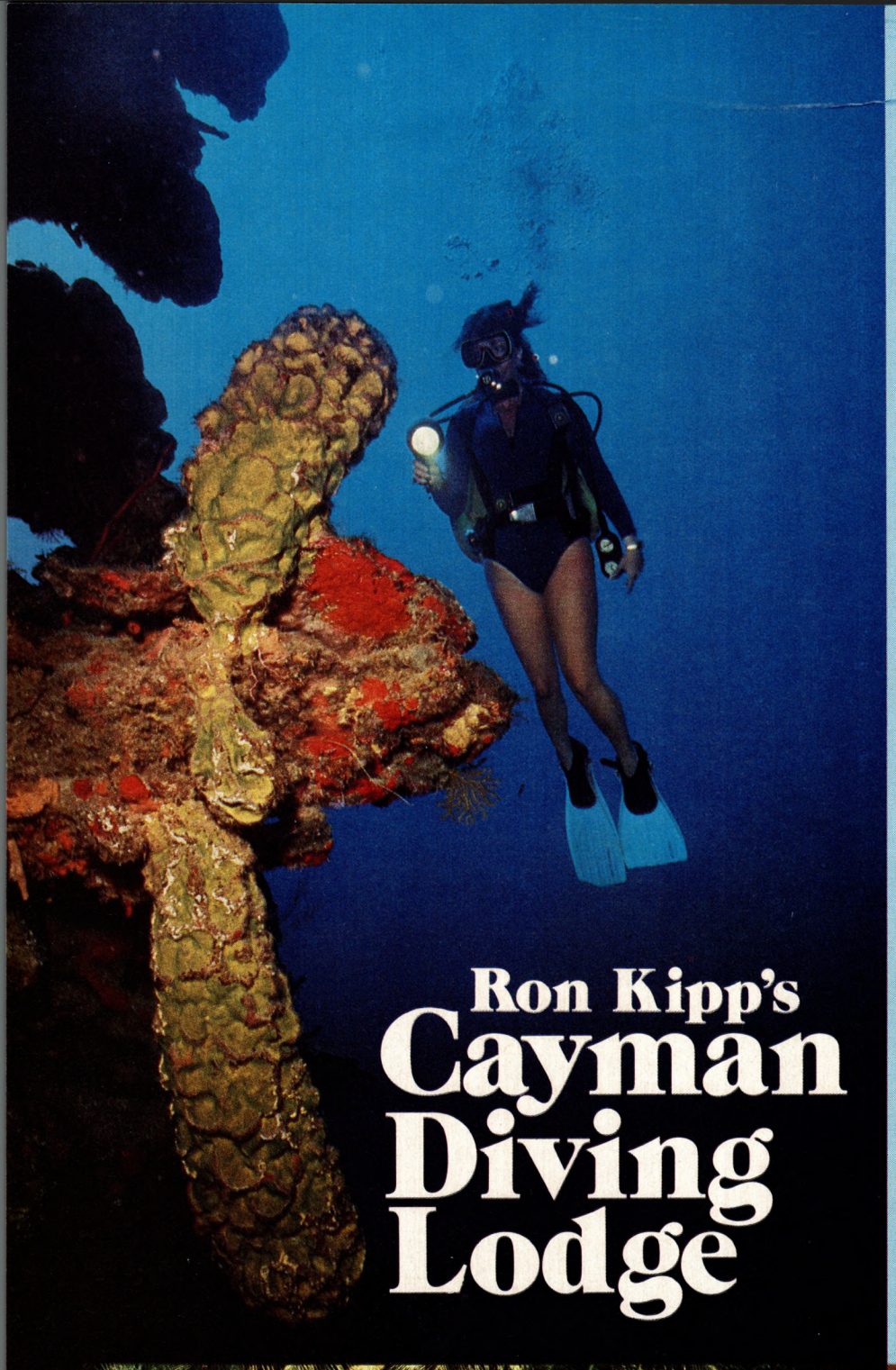
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Ron Kipp's Cayman Diving Lodge

Grand Cayman is, perhaps, the best example of a diver's island. Its flat topography belies the fact that it is a mountain tip barely protruding from the crystal Caribbean Sea and surrounded by an almost continuous circle of golden fringing reefs. While Horace Greeley once advised young men to go west in reference to pioneer territory in the U.S., on Grand Cayman it's "go east" for true wilderness diving and the least traveled reefs and wrecks.

To share a secret, I know where a lot of Cayman divers and divemasters go diving on their days off. About 35 minutes from George Town and the new airport is a place called the Cayman Diving Lodge. And, it is as friendly and unpretentious a place as a true diver's resort should be.

The three words, Cayman Diving Lodge, are all important keys to the conceptual image of the resort. Owned by people who live full time on the island and operated by divers who truly love their sport, the Cayman Diving Lodge represents everything a diver needs or wants. At the lodge you are received and treated not merely as a guest, but as someone who lives there, albeit temporarily. The lodge and its staff are like family; it's like going to someone's home for a visit.

Some travelers would not appreciate this concept, simply because the lodge is not a hotel. There are no phones or TVs (in the rooms), tennis courts, swimming pools or golf courses. There is simplicity, isolation and a beautiful way of life I had almost forgotten. It's the kind of place I have been looking for to regain my old enthusiasm for wall diving, wonderful shipwrecks and cozy nights under a starlit sky. The divemaster, or any of the employees, is apt to be sitting next to you at mealtime. Everyone eats together, dives

Grand Cayman's

Cayman Diving Lodge offers easy access





together and, unless you are a loner and purposely seek isolation, you will no doubt become good friends with members of the staff and other guests. That camaraderie extends to the evening hours as well, as most nights are spent in conversation. A Friday or Saturday night trip into George Town provides a spark of nightlife and "urban" behavior.

Part of the secret formula for the special atmosphere of the lodge is what it has been. The other part of the formula is how it is evolving. The main building (someone told me that it was originally operated as a movie theatre) was developed by Bob Soto as a divers' hotel. Additions were made and as Soto began to consider semi-retirement the lodge was sold to Austrian born cinematographers Gerry Hytha and Erich Heindl. They made the lodge into a center for serious filmmakers and photographers. In fact, Hytha and Heindl have retained their teaching relationship with the lodge to this day and offer a series of photo and video courses throughout 1985.

The evolution of the Cayman Diving Lodge is an important part of Ron Kipp's master plan. He acquired almost the entire Soto empire and with his wife Kathie, recently acquired controlling interest in the Cayman Diving Lodge. In George Town, Kipp has extended the Soto holdings like a network, covering the western shore with a series of quality dive operations, training services, stores and boutiques serving thousands of divers a year. A true Cayman ambassador of good will, Kipp deserves all the attention he is getting. He is truly one of the most organized and dedicated of all the Caribbean entrepreneurs. His affection and personal concern for the success of the Cayman Diving Lodge ensures a quality operation and a passport to unusual diving experiences. It is, as Ron and Kathie say, "our private place to escape and dive whenever we can get away."

Along with the Kipps, ownership is shared by Elita Soto, who with her former husband Bob, built the Cayman Diving Lodge into a special place for experienced divers. A lovely woman I have known for more than 15 years, Elita has kept the original concept of small groups and individual attention a trademark of the lodge.

Pat Scharr, part owner and the full time manager at the Cayman Diving Lodge, is an unusual lady with a single-minded devotion to duty. Pat was a teacher for 10 years and has a masters degree in exercise physiology. Formerly from the Chicago area, she trained thousands of divers and organized training and travel programs at the Illinois Institute of Diving. In 1983-84 Pat designed and opened Bob Soto's Scuba Centre where she served as manager of training; she currently serves on the NAUI board of directors as well. Pat's commitment to provide discriminating divers with excellent experiences and dive sites sets the tone for assistant Jan Johnston and divemaster Andy Johnston. Andy, a graduate of the prestigious Florida Institute of Technology's Sport Diving Operations Program is a NAUI and PADI instructor who works with divemaster Hutch Rankine and first mate Lawrence Rankine, Caymanians with dozens of years of East End diving and fishing experience. Jan, a PADI instructor, married Andy last year and the reception was held at the lodge.

The whole staff is very friendly. In fact, if there are any nicer people in this world than Grand Cayman East Enders, you can't prove it by me. And, with sing-song names like Bothwell, Edney, Arvella, Stella and Pamella, the staff floats in and out of your island stay with smiles, hellos and occasional outrageous humor.

The lodge is on Grand Cayman's southeast corner with its main building fronting the eastside beach road and its back porch, open air restaurant and lounge facing seaside to a white coral sand beach. A wooden dock extends into the shallow lagoon toward an offshore barrier reef. To either side a lovely grove of palm trees and sea grapes line the shore, running west toward the famous blowing holes and ironshore formations and east toward the small countryside community of East End Village. Hammocks in the western palm grove invite a relaxed view of tropical sunsets.

The rooms in this East End hideaway are clean, comfortable and spill out onto a porch overlooking a turquoise sea. While they do not compare with a modern skyscraper hotel in appointment and decoration, they are in keeping with the single, unpretentious credo of the lodge, "Great experiences and comfortable accommodations for seasoned divers." The food is special: Meals of fine native and American cuisine are prepared by experienced Caymanian chefs. In fact, several staff members have been working almost continuously at the lodge for 14 years. East End cooking is reputed to be the best on Cayman. It's down home island cooking and the portions served were more than I could handle. Soup, fish, ribs, chicken and key lime pie were the most memorable foods served me.

The two dive boats at the lodge provide ideal support for divers and particularly photographers. I especially liked the rug padded camera storage bin amidships and the cooler with coke, beer and extra

Exotic East End Diving

TEXT AND PHOTOGRAPHY BY RICK FREHSEE

to exotic U/W scenery and a relaxed, family-style resort. Staff includes (left to right) Pat Scharr, Kathie and Ron Kipp and Elita Soto.







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CAYMAN DIVING LODGE

film (Ektachrome and Kodachrome). Trail lines and a trapeze bar for safety decompression stops are provided. Another nice touch is the staff's assistance with camera and gear transfer.

The boats are a bit of floating history. The *Deep Six* is a 34 foot wooden boat built by Bob Soto and other Caymanian shipwrights. The *Barracuda* is a 28 foot fiberglass vessel. Both are V-hulled, open boats powered by single 353 GMC diesels. The dive shop is equipped with two compressors, 100 steel tanks and has a full complement of rental gear for up to 10 divers. Experienced divers are, of course, encouraged to bring their own regulators, BCs, etc. Weights and tanks are included in packages.

The normal schedule provides a deep dive and shallow dive (two tanks), usually in the morning. Options include a shallow single tank dive or deepsea fishing. Shore dives are available. Night dives under the dock normally produce a good number of critters for macro photographers. Crabs, lobsters, eels, starfish, bristle and tube worms are found regularly. The entire East End of the island has a pronounced platform of shallow, sandy bottom, speckled with patch corals. This leads to a fringing/barrier reef offshore, then a steep shelving to a dramatic drop-off. On the southeast and northeast sides the inside flat and outer reef are only 100-200 yards offshore while due east they extend for nearly a mile. The inside waters are calm and protected even during periods of high wind. On the outside the tradewinds blow against the east coast. Seldom do you get the calm, millpond effect often experienced on Grand Cayman's west and southwest shore. However, during the winter winds (northwesters) the East End of the island is protected in the lee.

First impressions last. And, my first impressions of wall diving were here in Grand Cayman along the wilderness shore. Sponges are king in the Caribbean and particularly on the walls of Grand Cayman. Along the East End drop-offs vivid complex tapestries, looking like Jackson Pollack paintings, confuse the eye. On the tops of ledges and shelves and on the vertical wall, deep water seafans, wire corals, black corals and sponges in hot colors suggest Picasso shapes. Subject matter is predictable, but never monotonous. Along the East End drop-offs in particular are hordes of royal grammas and black cap basslets. Large grouper are common and sharks, turtles and eagle rays are not that rare. On a scale of one to ten, East End Grand Cayman diving is always an eight or a nine with several tens, including the *Ridgefield*

wreck (shallow dive), Ironshore Gardens (medium depth), the Three Sisters pinnacles, the Tunnel of Love, River of Sand or the Maze (deep). To date more than 30 different dive spots are visited by the lodge with new ones being discovered all the time. This is a part of Grand Cayman rarely visited by divers. It is unusual to see another dive boat in the area and there are thousands of yards of outer reef that are virtually unexplored.

Lost Wally is a paradisiacal dive; it just doesn't get any better than this. Huge, monstrous coral formations are dissected by narrow fissures 50-80 feet deep. We experienced crystal visibility that allowed us to see long stretches of the wall. It is undercut in many places with plate and starlet coral forming dramatic, jutting configurations hanging over the ledge like a potential avalanche.

All along the wall is a forest of black corals (some like great trees), wide spreading deepwater fans and a wide variety of sponges in an assortment of colors. The sponges I photographed here rivaled any that I had seen anywhere in Cayman. Nowhere were the fish more plentiful and usually they could be approached within camera range.

The East End of Cayman is well known for dozens, perhaps hundreds of shipwrecks, victims of the offshore barrier reef. The most famous Cayman story of all is the Wreck of the Ten Sails. It involved ten English sailing ships that, following the lead ship, all piled up on the East End reef during a storm nearly two centuries ago. The people around Gun Bay saw what was happening and ventured out in the stormy seas, rescuing every English seaman aboard the boats. As a result, legend has it that King George declared that the Cayman Islands would be free from taxation as a gesture of his appreciation for the brave islanders. Whether or not the story is true, it is given credence by Cayman's continuing freedom from most forms of taxation.

Today, the wreck of the *Ridgefield* is the most conspicuous and while no longer completely intact, she is still a landmark and a signature of East End diving. An old liberty ship, the *Ridgefield* ran aground in 1962 during the Cuban Bay of Pigs invasion. When I first saw her in the late '60s the hull was in one piece; now she is broken in two. Local legend also indicates that her rusting hull sits directly atop two other, older shipwrecks—one a Spanish galleon and the other an English warship. There are other diveable wrecks to be sure, at least three others we visited. All were worthwhile dives with most sporting huge anchors and machinery in the sunlit shallows. Almost too shallow to dive, we found an old cannon in a pocket of the reef on the inside.

An extensive dive area off Cayman's southeast shore, a definite must dive, is Ironshore Gardens. This dive varies from

(Continued on Page 127)

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TEXT AND PHOTOGRAPHY BY JIM AND CATHY CHURCH

We lined up along the lava ledge, just below the dark maw of the cave. The photographers in the group anxiously checked their camera settings while the others peered into the cave's dark interior. Divemaster Jack Peterson slowly entered the left side of the cave. Only the tips of his fins remained visible as he disappeared into the darkness. Suddenly six feet of white-tipped reef shark swam out of the cave and soared over our heads. For several, it was their first underwater view of a shark. While some had been apprehensive before seeing the shark, everyone enjoyed this experience.

Show and tell is a Central Pacific Divers specialty. We had asked to see a shark and luckily the shark was in its usual place. However, you don't have to see sharks if you don't want to. You can dive sites where you can enjoy the lush fish life, U/W action and rugged terrain of Hawaiian diving.

Central Pacific Divers (CPD) is on Front Street, in Lahaina, on the valley island of Maui, 70 miles southeast of Oahu. It offers sales, rentals, instruction and both public and private dive charters. Multiple dive discounts and group rates are available. There are two large dive boats based in the marina, less than one-quarter mile from the store. Because most of the staff members have been with CPD for six or more years (an amazing record for any dive charter operation), they work together smoothly as a team. Long-term experience, tempered by the infusion of new ideas brought in by newer team members, gives CPD a blend of professionalism, experience and local lore that is hard to beat. Owner/managers Jane and Pete Cambouris work closely with their staff and help maintain an upbeat, friendly attitude.

The 42 foot *Odysseus* and 43 foot *Zephyrus* each carry up to 14 divers and a crew of three. The captains and crews rotate duties aboard the boats and in the shop. (Thus, you don't receive lackluster service from a burned-out divemaster who has been doing the same thing day after day.) All crew members are dive instructors and most are licensed captains, but their credentials tell only part of the story. Carol Takashima always takes time to make sure her guests are comfortable. Neil Graber has an eye for the small U/W critters that many divers miss. Steve Young is easygoing, jolly and can keep a group in a happy mood. Byron Dunn tries to act gruff, but is a big teddy bear. Cindy Young has a quick, sincere smile and makes you feel at home. Jack Peterson, Tony Turner and Mike Clossen are quick to provide professional, friendly service. And, behind the scenes, Jon Goode makes sure the correct amount of dive equipment and fresh food is aboard each boat, on time.

One boat makes a daily three tank trip while the other makes a two tank trip so it can return for an afternoon one tank introductory and/or refresher dive. Both boats leave early in the morning to avoid the occasional late afternoon wind and rising seas. After checking in at the shop, you proceed to the boat for pastry, coffee, fruit, juice and a concise briefing on the boat and diving procedures.

Dive destinations include Molokini Crater and several sites off the shores of the nearby island of Lanai, with the exact anchorage being determined as the boat nears the site. Travel time to Lanai is about 90 minutes and Molokini is about ten minutes farther. The boat ride itself is exciting. From about January to March, you frequently see humpback whales breaking the surface near the boat and spouting in the distance. Quartered oranges, vegetable sticks, potato chips and fruit juice are served for snacks; the beer and soft drink cooler is opened after the last dive. On the three tank trip, sandwiches are included for lunch.

Both boats have an enclosed cabin, a full-sized head and ample deck space for scuba gear. If you've ever spent several hours in a small boat, you will appreciate the comfort of these larger boats. You can sit on padded seats inside the cabin or on the shaded open-air deck aft of the cabin or you can lounge in the sun on the fore or aft decks. Don't leave your topside camera bag behind, there is plenty of dry space for it aboard either *Odysseus* or *Zephyrus*.

The CPD staff knows how to supervise the diving without pushing you around. They talk to their divers during the trip to the site and unobtrusively evaluate each diver's abilities. Later, they will provide just the right amount of structure and supervision. After a concise brief on the site, experienced divers can elect to either take a "show and tell" guided tour with a divemaster or dive on their own with their buddy. If you dive without the guide, you will be asked for your bottom time and maximum depth at the end of the dive.

We enjoyed diving Molokini crater—a crescent-shaped island about three miles off Maui's west coast. It is the top of an ancient volcano that erupted violently, forming an U/W crater about one-half mile across. Molokini has sites for both experienced and beginning divers. The outer rim is for experienced divers who are strong swimmers. Because the boats can't be anchored here, you step off the boat and swim to the almost vertical outer wall. Looking down through the clear water, you can't see bottom—only the wall plunging almost straight down into the distant blue. If there is a current, this becomes an exciting drift dive.

Inside the crater, you follow the anchor line down to the edge of the dive site. Neil, Tony or Steve can introduce you to the local residents. Several "tame" eels live in the area and your divemaster may pet them. If you wish to pet an eel, they will show you how. They may also show you some small sharks sleeping beneath lava ledges. Before the final dive in shallow water, the crew passes out small plastic bags of bread. Underwater, Carol or Cindy will show you how to make a fist around the bread so you can attract a living bouquet of gentle yellow butterflyfish.

We had just started our dive at Sharkfin Rock, off Lanai, when an octopus jetted past several surprised divers. A divemaster had found the animal and was showing it to the group. He passed it to Cathy and she posed with it for each of the photographers.

Our next dive was at Mempachi Cave, a long, narrow lava tube. Jack and Mike handed out lights and split up the group so the cave wouldn't be too crowded. Hawaiian, slipper and spiny lobsters were hiding in crevices and mempachi (squirrelfish) were everywhere. Maximum depth was about 40 feet, so we had plenty of time to explore the other archways and pinnacles nearby. If you like rugged underwater terrain, you will enjoy Mempachi Cave and the many other Lanai dive sites such as the spectacular Cathedral caverns.

At this writing, CPD is expanding its underwater photo and video service. The staff can photograph visiting divers underwater, so they can leave with color prints, slides or a video tape to show their friends back home. If you have your own camera, Nagamine Camera and Photo Shop (a short walk from the CPD shop) provides underwater camera equipment sales and rentals, film, color print and Kodak color slide processing.

United Airlines has direct flights to Maui from the mainland and Maui's Kahului Airport is a 45 minute drive from Lahaina. We've stayed twice at the Maui Islander, a hotel about two blocks from the CPD store and about three blocks from the marina. Because we get a room with a kitchen, and a Foodland store is only a ten minute walk away, we can prepare an early breakfast before the dive and a late afternoon snack when we get back.

For more information and reservations, write to: Jane Cambouris, Central Pacific Divers, 780 Front St., Lahaina, HI 96761; or phone (808) 661-8717. If you phone, remember Hawaiian time is two hours earlier than Pacific time and five hours earlier than Eastern time.

The Search For Paul Revere's SILVER

Does It Still Lie In Maine Waters?



photo/Bangor Daily News

General Chamberlain Bridge, Penobscot River, where divers found four cannons.

BY HOWARD M. DUFFY

The mention of Paul Revere's name always brings to mind his immortal midnight ride. His mission was to alert colonists of the British advance to capture military supplies at Concord, Massachusetts, at the dawn of the Revolutionary War. Not as well known is another adventure in which Revere lost a trunkful of his handwrought silver masterpieces in Maine's Penobscot Bay, in 1779, during an infamous naval disaster. Divers still search for the priceless works of the silversmith-turned-soldier.

The history of this ill-fated event began in June of that year when General Francis McLean sailed down from Canada with 450 British troops to take possession of the peninsula called Bagaduce (now Castine) on the east side of Penobscot Bay. Here, on a bluff 200 or more feet above the water, McLean began to build Fort George.

When word of this occupation reached Boston, the General Court of Massachusetts was greatly disturbed. As an upshot, orders were immediately issued to prepare an expedition to drive out the enemy. Most of the colonies were accustomed to operating independently, so Massachusetts did not bother to consult with the Continental Congress before taking action.

Brigadier General Solomon Lovell was



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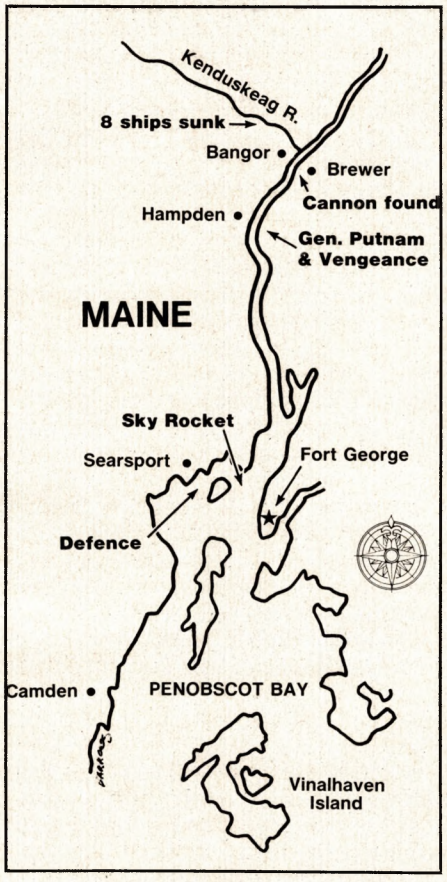
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ordered to take command of 1,200 militia, with Adjutant General Peleg Wadsworth second in command and Lieutenant Colonel Paul Revere in command of the artillery train. Massachusetts authorities were successful in wrangling from Continental leaders a loan of the frigate *Warren*, a fine new ship of 32 guns and the sloop *Providence*, mounting 12 guns. Additional arrangements were also made to hire or impress private armed ships.



Of course there were the usual delays and problems caused by acute shortages of men, money and material. However, these problems were patched up sufficiently for Commander Dudley Saltonstall, of the Continental Navy, to lead a very mixed fleet out of Boston on July 19, 1779 for the assault on Fort George. In all, there were 19 armed ships and 21 transports, manned mostly by privateersmen who were extremely loath to accept this service. It was only because of threats and bribes that they went along at all. Organizing them into a regular expedition was about like harnessing so many seagulls. Incredibly brave, ferocious as wild hawks on occasion; in other encounters they were accustomed to simply making sail and leaving. Saltonstall probably had little control over them.

Neither were the soldiers exactly an elite corps. These 1,200 militiamen, mostly boys and old men, had but "500 stand of arms" among them. Paul Revere's artillery train was also less than impressive—only three nine-pounders and four field pieces. However, this force was

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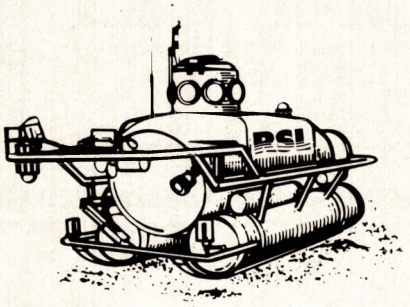
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bolstered by some 800 marines aboard the ships.

It was on July 25 that the fleet and transports entered Penobscot Bay, after a stop at Townsend (Boothbay). Fortunately, the British fort was far from completion. As one American officer remarked, the earthworks were so low "a soldier with a musket in each hand could jump over them." Also, the three armed British ships expected to be encountered seemed to have been reduced to two.

Shortly after arrival, the marines landed and a battery was put in position against the merest show of resistance from the British. Later, a storming party established a firm foothold on the top of the cliff where the Redcoats were posted. Meanwhile, Saltonstall's ships sailed about the bay without coming within cannonshot of the British sloops. During this same period there was much haggling among the Yankee officers, concerning the feasibility of continuing the siege. Revere was one of eight officers in favor of abandoning the enterprise.

During this time of indecision Saltonstall received a dispatch, informing him that a British relief force was on its way and that he must launch an attack immediately in order to ensure the success of the American expedition. Under pressure from all sides, Saltonstall summoned his courage and plans were laid for a full scale land and sea assault to take place on August 13.

Offshore, Saltonstall moved his ships silently into position under cover of darkness. In the gray dawn hours Lovell advanced his troops close to the fort. Everything was ready. A morning fog delayed the attack a few more hours. As the Yankees stood ready at their guns, Saltonstall received another urgent message that a British fleet was only a short distance away. It consisted of the 64 gun *Raisonable*, accompanied by three frigates and a similar number of sloops.

At first Saltonstall thought about making a defense and attempting to hold off the British ships while his transports evacuated the Yankee troops to safety farther up the bay. That plan rapidly disintegrated when the privateer crews spotted the advancing British ships, their sides bristling with open gun ports. So, with no heart to tangle with experienced marksmen, Saltonstall gave the signal for his ships to scatter and seek safety as best they could.

What a hideous catastrophe! Yankee ships ran aground. Some, including the *Warren*, were blown up by their own crews or set afire. Others tried to run up the Penobscot River to safety. Everywhere soldiers and sailors were scrambling through brush and woods, trying desperately to escape.

Historians count 14 vessels blown up or torched by their Yankee crews and 28 captured. Five hundred Americans were either killed or taken prisoner and more than $7 million squandered on the ill-fated venture.

But, what of the treasure lost by Paul Revere? Well, it seems that the old patriot was a more astute businessman than soldier, for aboard the brig *Spring Bird* in Saltonstall's fleet was a trunk full of Revere's hand wrought silver masterpieces he had hoped to sell to other officers participating in the expedition.

When the British fleet advanced the *Spring Bird's* captain could see he had no means of escape except by proceeding up the Penobscot. However, a swifter enemy craft was closing in rapidly, so the Yankee pulled near the river bank where the captain ordered her set afire to prevent her falling into British hands. After the captain and crew swam the short distance to shore they could see the *Spring Bird* burn to the waterline and sink—taking Revere's silverware and personal belongings to the bottom. (Skin and scuba divers have long sought to recover this very valuable treasure, but the river has always defied them. But, some day a diver is going to make a lucky find.)

What of the other ships from the ill-fated expedition? We know where some of these wrecks lie and periodically divers surface with valuable artifacts. For instance, in the uproar of the retreat the 16 gun *Defence* attempted to flee to the open sea rather than escape upriver. Pursued by the H.M.S. *Camilla*, she sailed toward Stockton Harbor, intending to hide in a cove at Sears Island. When this maneuver failed to elude the Britisher, Captain John Edmonds ordered the torch put to his 100 foot brig, causing her to blow up and sink as flames hit the powder magazine.

Saltonstall's flagship, the *Warren*, made it as far as Oak Point Cove near Frankfort where it was also set afire and burned to the waterline. Also, the brig *Active* met a similar fate at Brigadier's Island and the *Sky Rocket* was burned at Fort Point Ledge. The *General Putnam* and the *Vengeance* were purposely grounded near Hampden and blown up. Then eight other Yankee vessels fled upriver and were scuttled in the Kenduskeag River north of Bangor—a sorry statement for the Continental Navy.

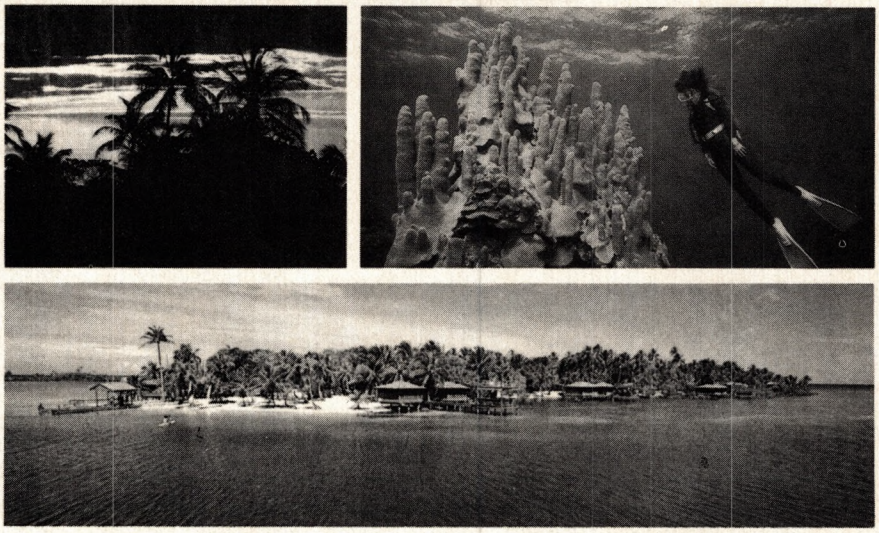
Following this rout, the survivors made their separate ways back to Boston as best they could. The authorities were exceedingly angry over this ill-starred episode and there was plenty of blame to be cast about. As a result, Saltonstall was court-martialed and dismissed from service. Paul Revere was also court-martialed, but only reduced in rank.

Have any artifacts from the expedition ever been found in Maine waters? Yes, a construction crew building the General

(Continued on Page 119)

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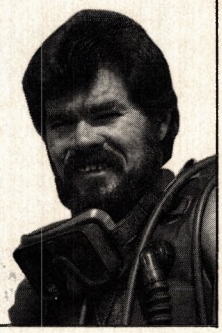
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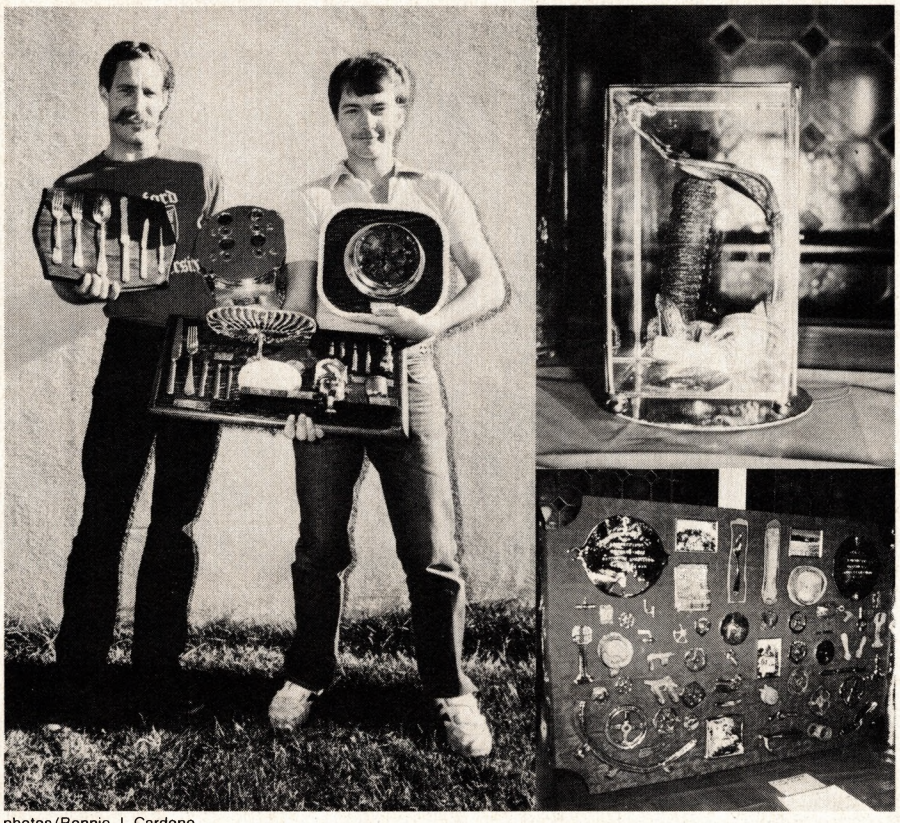
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BRASSOHOLICS

Treasure Is In The Eye Of The Beholder

BY PETER JENSEN



photos/Bonnie J. Cardone

Dan Purdie (left), Peter Jensen, brass.

Search for sunken treasure is viewed by our staid society as an enterprise proper only for eccentrics and incurable adventurers. But, the meaning of the word treasure is relative. To some the word brings visions of golden doubloons, ducats, ducatoons, silver plate and pieces of eight. This type of treasure is obtained by very few. To many of us, treasure denotes items which fall into the general category of nautical, antique brass. Many of us have bits and pieces of such marine memorabilia stuck up on the wall or in a prominent location on the mantel, conveniently in front of our mother-in-law's photo.

There are many ways collectors acquire sparkling, brassy treasure. Some buy it, some trade for it and some dive for it. This latter is the group I stumble into.

The ocean is a fascinating place to explore, you never know what you'll find there. This may be why, in Los Angeles, where lunacy was first invented, there are more than 250,000 certified divers. To some of these, treasure is fish. Just look in old issues of SKIN DIVER—you are sure to find a photo of some intrepid sportsman standing beside a speared grouper. You can always identify the fish: Though dead, he looks the more intelligent of the two.

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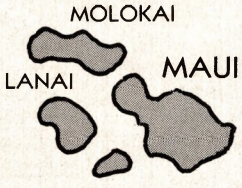
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There are also those who hunt for the perfect underwater photo. This species of diver also excels in the art of wringing seawater out of flooded cameras.

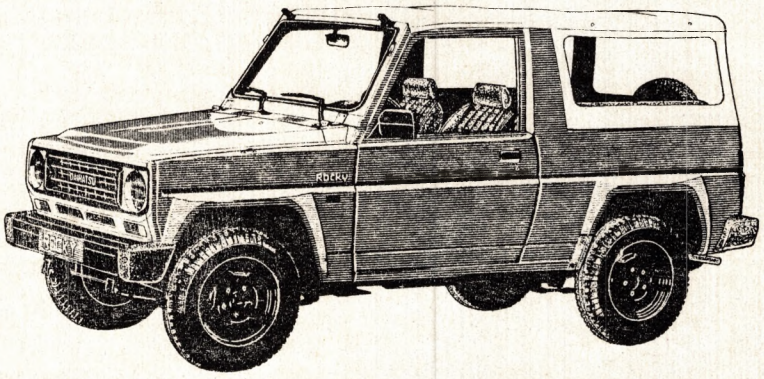
Last, and least, there are a few loonies who enjoy shipwrecks. Wreck diving can be a hair-raising, not to mention hare-brained, sport. Hardcore wreck divers have a disease called brass fever. What else can it be called when a 9:00-5:00, Monday through Friday, paper shuffling Jeckyl turns into a 48 hour, $500 weekend Hyde? Mr. Hyde returns from a shipwreck safari on Sunday night with a small lump of nondescript brass and claims it was worth it. In Southern California, a planet unto its own, there is a movement underway to establish an organization called BA—Brassoholics Anonymous.

Brass fever, like any other mind altering addiction, can be expensive. Last year three California Wreck Divers bought shiny new boats for the sole purpose of acquiring brass. The expense does not stop once an item has been retrieved from the briny depths. For example, Dan Purdie, who is otherwise a fine chap, suffers from brass fever. A piece of brass that ended life as a valve aboard a freighter sunk off the California coast was reincarnated by Dan into a beautiful table lamp for only $580. "How could it cost so much?" Larry Landlocked may ask. Well, there was the boat trip, acid to rough clean the find, glass beading (a wreck diver never has his finds sandblasted, how barbaric; a purist has it glass beaded so as not to pit or mar the surface), rough polish, brazing, professional polishing, professional baked coating, woodworking for teak base, custom made lampshade and miscellaneous hardware. It all adds up to a real bargain.

One of the cheapest and best investments a wreck diver can make is to buy a good short handled sledge hammer. I met Mr. Sledge while diving the rusting carcass of a WW II destroyer. It was shallow, very close to shore, in white water called the surge zone. Among the shattered ribs was a porthole, firmly held in place by a matrix of jumbled steel, rocks and seagrowth. It would not budge. My mask was filling with tears at the thought of leaving this port when suddenly Mr. Sledge came to the rescue, whisked to the scene via a fellow brass hound. In a jiffy that cute little port was dangling on the end of a lift bag, floating its way back to the boat and a new life as an end table.

Wreck diving, by its very geographic nature, puts its participants into the strangest of areas and circumstances. There are many stories: humorous stories of incredible stupidity such as boat and trailer plunging off a Northern California goat path that was marked "access road" on an 1857 chart; sad stories as when a wreck diver's boat was decimated by a drunk driver; happy stories of salvage up and down the coast; then the inevitable addiction stories.

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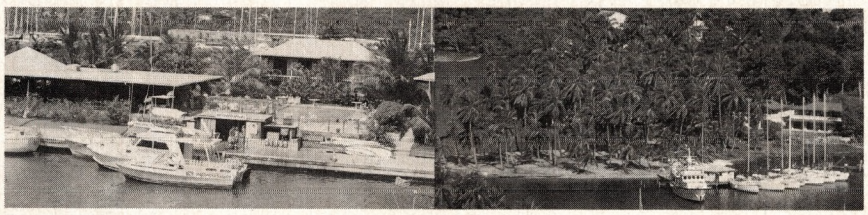
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BRASSOHOLICS

My friend, Paul, a 9:00-5:00 lawyer, alias weekend wreck warrior, and yours truly were (in the blissful prime and ignorance of youth) beach diving a wreck called the *Aras* at Santa Catalina Island. On our final dive one day we discovered something we could not leave without. So, that afternoon, the ferryboat to the mainland left without us. Our single day budget quickly turned into a three day budget spent entirely on air fills. For those three days we survived on a bag of cheeze puffs. At night we slept in cardboard boxes on the beach and the rest of the time we dove. So much time was spent in the water working on our discovery that barnacles grew on our wetsuits. How we got off Catalina before cannibalism set in was owing to our having purchased roundtrip tickets before leaving Los Angeles. Our discovery? It came home with us, of course.

Brass fever has no regard for sex, beauty or weirdos. It can hit anyone. A perfect example is found with Dr. Jerry and his wife, Mitzi. Theirs is the only house on the block which has humongazoid T-2 tanker portholes for windows! When this couple finds a porthole, they hang it up like moose antlers on the first available wall. Mad Dog Jerry (a dentist, believe it or not) is always flashing his pearly whites in an ear to ear grin muttering things like "You'll never guess what I found." Why did he become a wreck diver? He can't sing and he can't dance. Mitzi, Jerry's better half indeed, is a school teacher with skin any male with warm blood oozing in his veins would die for. When she talks, extolling the virtues of brass, her eyes glaze over. "Ah brass, it stirs the blood, clears the sinuses, gives one a sense of purpose," she'll say. She's obviously a hopeless brassoholic.

Once a month the people I've already mentioned and other nautical scroungers and packrats gather in West Los Angeles. Ears pierced with heavy gold rings, they sing obscene sea chanteys, snarl at each other and fondle everyone's brass. California Wreck Diver meetings often have the flavor of cutlasses and the black flag, with its skull and crossbones. No secret decoder rings here, they just drape themselves over the bar—a noble band, famed in song and story, howling like jackals and public outcasts—my kind of people. Mysticism pervades the room, as does the sense of discovery, exploration, adventure and historic romance.

The search for brass treasure is a most bizarre and adventurous calling. Wreck diving is always an experience spiced with a chance to strike it rich. Certainly the chances of becoming an overnight millionaire are slim, but no matter, to a California Wreck Diver the experiences are always rich.

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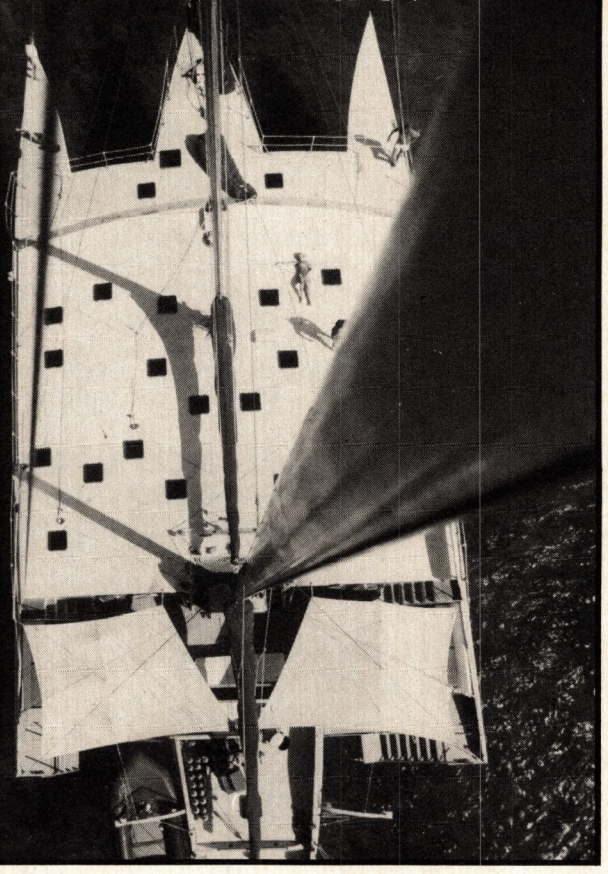
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SOUTH COVE DIVE BOAT FLEET

South Cove Resort on Grand Cayman has added a 38 foot Delta dive boat to its fleet. Formerly in operation at South Cove's sister resort, Spanish Cove, the *Cove Diver* is equipped with a full dive platform, diesel power, freshwater shower, VHF and cassette stereo. The addition of the *Cove Diver* increases both comfort and capacity for divers wishing to visit the many and diverse dive sites within a short boat ride from the resort.

For further information or reservations, please contact South Cove Resort at (800) 231-4610 or (305) 381-9954.

SEA OTTERS TO SAN NICOLAS ISLAND

The U.S. Fish and Wildlife Service is pursuing a plan to establish a new colony of sea otters, officially designated a threatened species, somewhere off the West Coast. Although a specific site will not be be chosen until this fall, San Nicolas Island appears to be the favorite.

The Channel Island farthest from the California Coast (70 miles), San Nick encounters the least diver and fisherman pressure. Many divers look upon San Nick as the ultimate destination for game, including lobster, fish and abalone.

Many divers feel the translocation (over a five year period) of up to 400 sea otters to San Nick will severely reduce the populations of shellfish there. Sea otters are known to eat up to 25 percent of their body weight daily (adults can weigh up to 85 pounds) in shellfish, including those species prized by divers. Additionally, San Nick is known by biologists to be a low recruitment area for marine animals. This means that a lower number (than usual) of young animals survive long enough to reach spawning size—and this is without otter pressure. (It is also believed by many that otters established on San Nick will spread to other Channel Islands.)

In addition to the belief that ab and lobster populations at San Nicolas Island could be decimated by sea otters, divers are also very concerned because Fish and Wildlife is expected to "regulate access" to the island if sea otters are translocated there. At a hearing in Santa Barbara last year, a representative from Save Our Shellfish (SOS) asked Fish and Wildlife if "regulate access" meant divers and fishermen would be denied access to the island's waters: The question went unanswered. It was stated by Fish and Wildlife that when user conflicts were evaluated pertaining to San Nick, *sport divers were not considered.*

Your opinions on this issue are important. Letters expressing your views can be sent to: Richard J. Myshak, Regional Director, U.S. Fish and Wildlife Service, 500 N.E. Multonomah Street, #1692, Portland Oregon 97232; or U.S. Congressman John Breaux, 2159 Cannon House Office Building, Washington, D.C. 20515.

PHILIPPINE MEDICAL SYMPOSIUM

Poseidon Ventures Tours and Michael Strauss, M.D., Memorial Medical Center, Long Beach, CA are hosting a Diving Medical Symposium to the Philippines aboard the 120 foot diving yacht, *Lady of the Sea*. Thirty hours of Category I CME credit will be offered. The trip departs November 14 and optional pre and post tours to the Orient are available.

For information and bookings, contact Poseidon Ventures Tours, 359 San Miguel Dr., Newport Beach, CA 92660 or call (800) 854-9334.

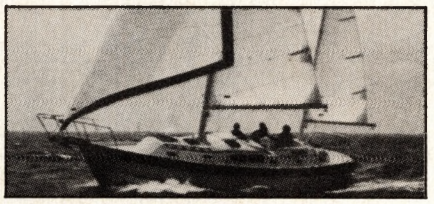
SEA FEVER

Sea Fever Diving Cruises, Inc. has had a change of address and office management. Jeannie Nielsen has taken over the office operations. The new office is at Miami Beach Marina, adjacent to the docking facilities used by the 90 foot Bahama dive boat *Sea Fever.*

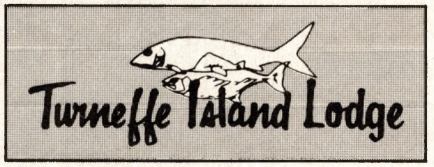
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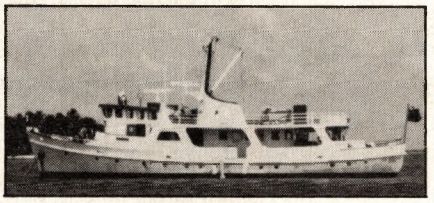
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Sea Fever runs five day trips to Cay Sal and the Bahamas. The new address and phone number are: Sea Fever Diving Cruises, Inc., P.O. Box 39-8276, Miami Beach, FL 33139; (305) 531-DIVE.

VOGEL'S 25TH

Joe Vogel and his wife Debby are celebrating the Joe Vogel Diving Company's 25th year as the oldest certified diving school in the U.S. Virgin Islands. Vogel made his first dive in 1947 and his career



as an instructor began in Indiana in 1953. More than 50,000 divers have dived with him since then. Vogel personally conducts all classes and reef, night and wreck dives in small groups and goes out seven days a week. Debby is available to shoot professional quality photos of divers and can provide practical and creative hints for U/W photographic efforts.

The Vogel's home and Dive Center houses the classroom and an open air shop. Both are less than a 20 minute drive from any hotel on St. Thomas and have plenty of parking space. For information, write Debby Powers-Vogel, Manager, Joe Vogel Diving Co., P.O. Box 7322, St. Thomas, USVI 00801 or call (809) 775-7610.

PENOBSCOT WRECKS

(Continued from Page 113)

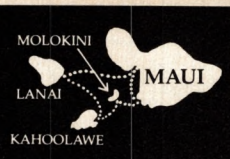
Chamberlain Bridge, in 1953, discovered four of Revere's iron cannons in the Penobscot River. Also, a brass cannon valued at $10,000 and forged in Revere's own shop was salvaged from the river at Brewer. Divers, too, have located the remains of three ships—the *Warren*, *Vengeance* and *General Putnam*.

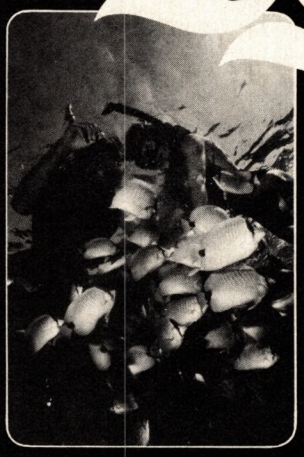
History professor Dean Mayhew and some of his students had fine success in 1972 searching Stockton Harbor with sidescan sonar. They found the *Defence*!

Diving into some 25 feet of water, these adventurers brought up one of the vessel's large, swivel-mounted cannons. In 1975, in a more ambitious quest, the group recovered a large number of artifacts from the wreck of the *Defence*—a copper caboose (deck stove), a copper cauldron, pewter spoons, tools, navigational instruments, cannon balls, buttons and other items of historical interest.

However, the wreck of the *Spring Bird*, concealing Paul Revere's trunk of precious silverware, still eludes searchers. Perhaps you may have more luck than previous divers. Go get it!

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Ocean Activities Center, one of Maui's pioneers in all types of ocean activities, offers scuba and snorkel tours, charter fishing, beach activities, and whalewatching, too. From Maalaea Harbor on Maui, Ocean Activities Center operates daily scuba/snorkel cruises to Molokini and Lanai. Diving around Maui and Kahoolawe can also be arranged.

Good News! **Ocean Activities Center operates the Hotel Lanai, the first and only dedicated dive lodge in Hawaii.** The rustic Hotel Lanai has only ten rooms, but the best feature is that you are close to over 30 great dive spots—some of the best diving in Hawaii—diving that is virtually inaccessible to the resort areas of Maui and Oahu.



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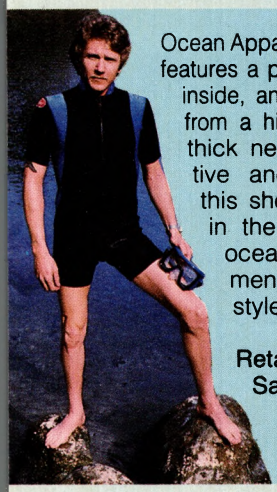
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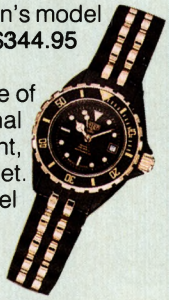


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Heuer's Black Coral II watch is one of our most popular. This professional type watch features quartz movement, screw-down crown, date, & steel bracelet. Men's model #980.029, Women's model #980.028. **Retail $375.00, Sale $299.95.**



Parkway quality, Berry Scuba designed, this plush lined ¼" thick farmer john is an attractive suit loaded with features. Five delrin zippers provide a lifetime of trouble-free use, velcro beaver tail, over taping on all edges, and a special plush fashion stripe across shoulders and arms. Men's & Women's suits available. **Retail $360.00 Sale $249.95**



A. VIP suit by Ocean Apparel is a farmer john wet suit. This ¼" thick suit has plush lining inside and out! Other Features; a velcro beaver tail, knee pads, contoured fit, and delrin zipper, two color combinations, men's or women's. **Retail $399.00, Sale $279.95.**

B. Economy package; Waterlung X3 piston regulator,Princeton PG 2 pressure gauge (lifetime warranty), Trinidad jacket BCD w/ power inflator & pack. **Retail $426.00, Sale $259.95.**

C. Snorkler's package; easy clearing, low volume U.S. Diver's Fisheye II mask, model TBT large bore snorkel w/ "Glo" top, black rubber shoe fins (give shoe size). **Retail $81.95, Sale $54.95.**

D. UL750 dive light; 100,000 candlepower & sealed beam bulb, uses 6 volt lantern battery (not included). **Retail $39.95, Sale $31.95.**

E. Cordura regulator bag, blue color. 11 X 5 X 6 inches. **$7.95.**

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CC. Diver's package: low volume Triview silicone mask w/ lightweight snag-free frame, Silicone snorkel w/ easy clearing purge and clear bore, Oceanic clear open heel vented fins w/ adjustable heel strap. **Retail $144.00, Sale $115.95.**

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Diving News From Down Under

Southern Coral Sea Tour

TEXT AND PHOTOGRAPHY BY GERI MURPHY

Some of diving's most spectacular phenomena lie approximately 200 miles off the Australian coast. Among thousands of miles of open ocean are small, widely spaced coral atolls that are uninhabited and untouched by civilization. These mid-ocean way stations are comprised of magnificent living coral structures that attract a spectacular array of marine life never found in coastal waters. Visibility generally exceeds 200 feet and the reef is literally crowded with fish.

These open ocean reefs offer a kind of diving that defies description. It is so rich, so adventurous, that divers returning to this area of the world speak about their experiences for years afterward.

Several years ago, See & Sea Travel Service of San Francisco developed a concept for a very special type of long distance live-aboard dive cruise known as the Grand Tour. It was the ideal solution for reaching the remote coral atolls of the Coral Sea.

Working with one of Australia's finest live-aboard dive boats, the *Reef Explorer*, See & Sea explored and charted a long string of outstanding dive locations. Names such as Marion Reef, Action Point, Flinders Reef, Diamond Reef and Dart Reef have become legendary.

The Grand Tour of the Southern Coral Sea is an odyssey that covers 600 to 700 miles of ocean travel during a ten day period. Most of the cruising is done at night, leaving the days completely open for wall-to-wall diving.

Once again, See & Sea has organized a number of trips through the Southern Coral Sea, with the first tour departing October 20. The last tour departs December 1. All five expeditions are scheduled from October through December because it is the finest time of the year (Australian summer) for diving the Coral Sea area. The trip begins with the flight from the U.S. to Australia with connections to the seaport of Townsville. Here visitors board the 60 foot *Reef Explorer*. It can comfortably carry 12 divers and is equipped with special satellite navigation equipment for the long distance trip and to pinpoint the locations of coral atolls.

After cruising the Coral Sea for ten days, the trip is capped off with a visit to the *Yongala*, one of the most beautiful shipwrecks of the South Pacific.

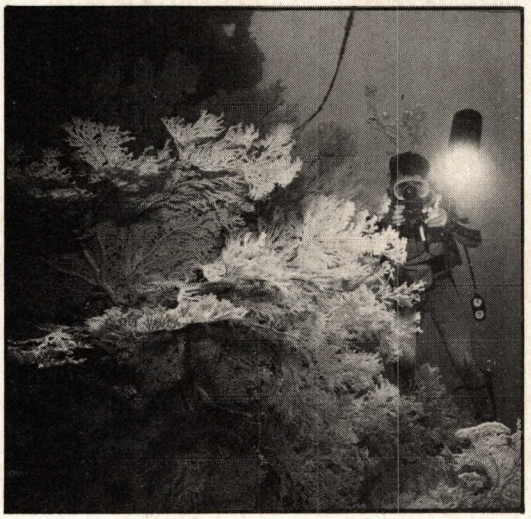
For more information about the Grand Tour of the Southern Coral Sea, contact See & Sea Travel, 680 Beach St., Suite 340, Wharfside, San Francisco, California 93109; (415) 771-0077.





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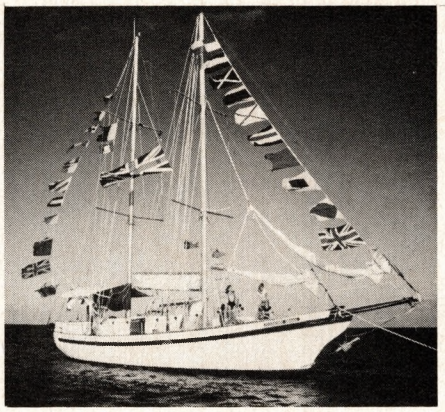
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See & Sea's 60 foot motor sailer *Sir Cloudesley Shovell* is spending the summer in dolphin country in the Bahamas.

In September the dive cruiser will return to its home base in the Turks and Caicos Islands to resume its regular series of one week cruises. The *Sir Cloudesley Shovell* has three private double cabins, fine food and unlimited diving.



For further information and bookings for individuals or groups, contact: See & Sea Travel, Inc., 680 Beach Street, Suite 340, Wharfside, San Francisco, CA 94109.

ALM LOWERS FARES

ALM Antillean Airlines now has lower air fares to the Netherlands Antilles in conjunction with Delta, Northwest, Midway, Ozark and Republic. The new roundtrip airfare to Bonaire and Curacao is valid from Chicago, Cincinnati, Cleveland, Columbus (OH), Detroit, Kansas City, Lexington, Louisville, Memphis, Milwaukee, Minneapolis and St. Louis.

This fare, valid seven days per week, permits the traveler who goes to one of the islands to take a side roundtrip to a second island.

BAHAMAS FREE DIVING CHAMPIONSHIPS

The Bahamas Free Diving Championships will be held at the Andros Beach Hotel September 6-8. Sponsored by the Bahamas Diving Association, the Bahamas Ministry of Tourism and Cressi-sub, the event will have a maximum of 30 participants competing in male and female categories in open and masters (over 40) divisions. Maximum depth is the goal and prizes will be awarded.

For more information contact Bahamas Sports Information (800) 32-SPORT or Neal Watson's Andros Undersea Adventures (800) 327-8150; in Florida and Canada (305) 564-8633.

MIDDLE EAST MARINE LIFE PHOTOS NEEDED

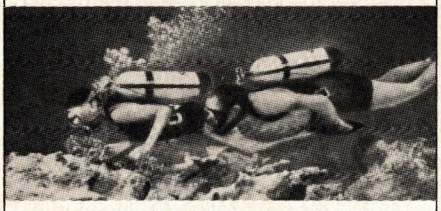
Frank Graves of Nicosia, Cyprus is writing two books on the marine life of the Middle East. The first is a classification book that will include technical literature on the species found in the Arabian Gulf. The second book will be more general, covering fish and invertebrates and their habits, oddities, dangers, etc. It will emphasize the Gulf of Oman, Gulf of Aden and the Red Sea.

The classification book will include colorful drawings of the marine life emphasized. These drawings will be made from photos of the animals when possible. The general book will use photos instead of drawings. Consequently, Graves is asking SDM readers to send any photos they can spare of the animals of this area as well as marine life photos in general. These photos can be old, new or duplicates, in color or black and white.

Assistance rendered for the general book will be acknowledged in it. The classification book will be printed in Arabic—it is designed to make the young people of this area aware of their marine heritage. Brief acknowledgement of assistance in this project will also be given in the book.

For more information contact Frank Graves, P.O. Box 4755, Nicosia, Cyprus or Frank Graves, c/o Department of Fisheries, Cyprus.

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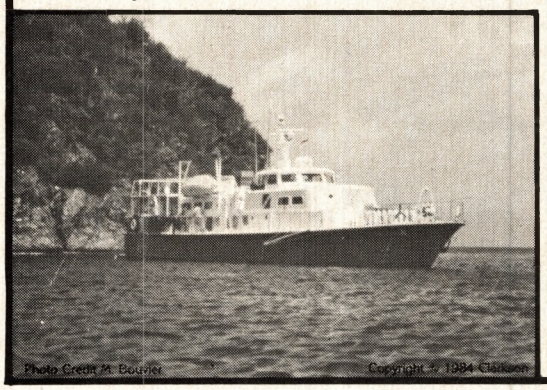
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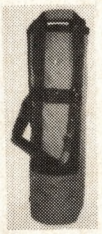
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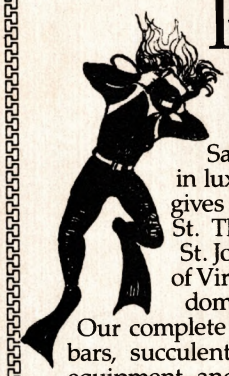
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AROUND-THE-WORLD EXPEDITION

From exploring underwater caves in the Bahamas to ecology reefwatch programs and treasure diving, an around-the-world expedition initiated by Britain's Prince Charles offers a wide variety of diving opportunities for its participants.

Operation Raleigh, launched in November 1984, will continue for four years. The program is for 17-24 year olds called "Venturers" from over 40 countries. The first three month phase of the program was recently completed in the Caribbean. A thumbnail sketch of diving projects thus far includes first time dives into unexplored blue holes off Grand Bahama, Cat Island and South Andros. Biological surveys were made of inland and marine species.



Treasure diving from *Zebu*, the expedition's square rigger, off the West Caicos produced several discoveries. Among them were copper coins from the *Marie d' Estree* (1728), a French ship en route to Canada with a freshly minted supply.

The Operation Raleigh Venturers also used Sub-Igloo, developed by Dr. Joe MacInnis, chairman of Operation Raleigh-Canada. The acrylic sphere, eight feet in diameter, provided a diver refuge in 40 feet of water off the Bahamas.

Among the groups working with operation Raleigh are the United Nations Environment Program World Wildlife Fund and World Ship Trust.

According to Mark Benson, executive director of Operation Raleigh, the expedition has an ongoing need for highly experienced diving instructors to serve on the volunteer staff and research teams.

Operation Raleigh eventually will involve 4,000 young people. Venturer applicants must be 16-23 years old, able to swim 500 yards and English speaking. Applications should be requested from National Selection, Operation Raleigh USA, 109 E. Jones St., Raleigh, NC 27611. A self-addressed envelope must be enclosed.

Those interested in joining the expedition as a member of the volunteer staff or donating diving related equipment should contact Mark Bensen at the same address.

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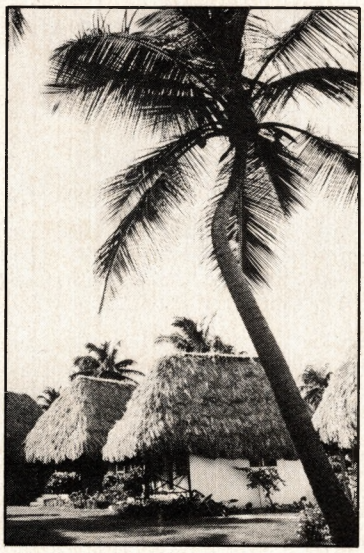
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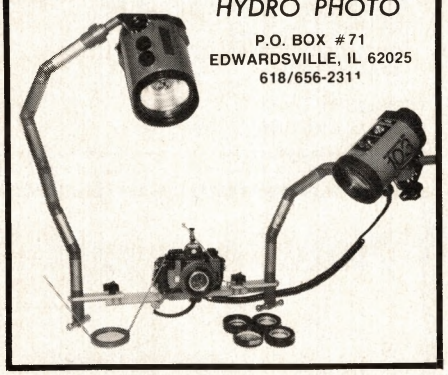
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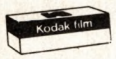
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FOSTER'S PHOTO DIVE PACKAGES

Don Foster's Dive Grand Cayman Ltd. has three new dive vacation packages for summer 1985, designed specifically for underwater photography buffs.

Each package offers access to the new, custom-built facilities of Foster's Photos, now at the Foster's headquarters in the Royal Palms Hotel on Seven Mile Beach. Resident photo pro Brad Graham is in charge of this full-service facility. It includes camera and accessory sales; overnight E-6 processing; custom screening room with large light tables and special photo coaching and courses on request.

The Photo Access Dive Package includes seven nights/six days accommodations in a standard room at the Royal Palms Hotel; six morning two tank dives and one afternoon or night dive upgrade; two rolls of processing per day; use of the Foster's Photos screening room facilities; 25 percent discount on photo rental equipment (excluding camera bodies), and unlimited shore diving.

The Underwater Photo Certification Dive Package includes seven nights/six days standard accommodations at the Royal Palms; six morning two tank dives and one afternoon or night dive upgrade; two rolls of E-6 processing daily; use of Foster's Photos screening room facilities and light tables; one free critique from the photo pro; 25 percent discount on photo rental equipment (excluding camera bodies) and unlimited shore diving. This package includes certification as a PADI underwater photographer specialty diver.

The Advanced Photo Package includes all of the services and offerings in the Photo Access Package plus three critiques by the photo pro; instruction in two-projector slide production and presentation and a videotape of the finished two-projector slide presentation.

All divers on photo packages will be accompanied on the dive boat with knowledgeable photo guides, who will assist in any way possible. The boat is equipped with rinse tanks and air guns for camera maintenance.

A special villa option for accommodations in one of Hospitality World Grand Cayman's luxury oceanfront apartments can be arranged for Photo Dive Package customers on request. Information on rates and choice of units is available from Foster's Grand Cayman office.

For information and reservations contact Don Foster's Dive Grand Cayman Ltd. through Scuba Tours Inc. (800) 526-1394; in NJ (201) 256-9115 or phone (809) 949-2636, P.O. Box 490, Grand Cayman, BWI.

CAYMAN DIVING LODGE

(Continued from Page 107)

30-50 feet and is a massive reef formation capped with golden elkhorn corals. It is riddled with caves, caverns and tunnels, that form many swim-throughs.

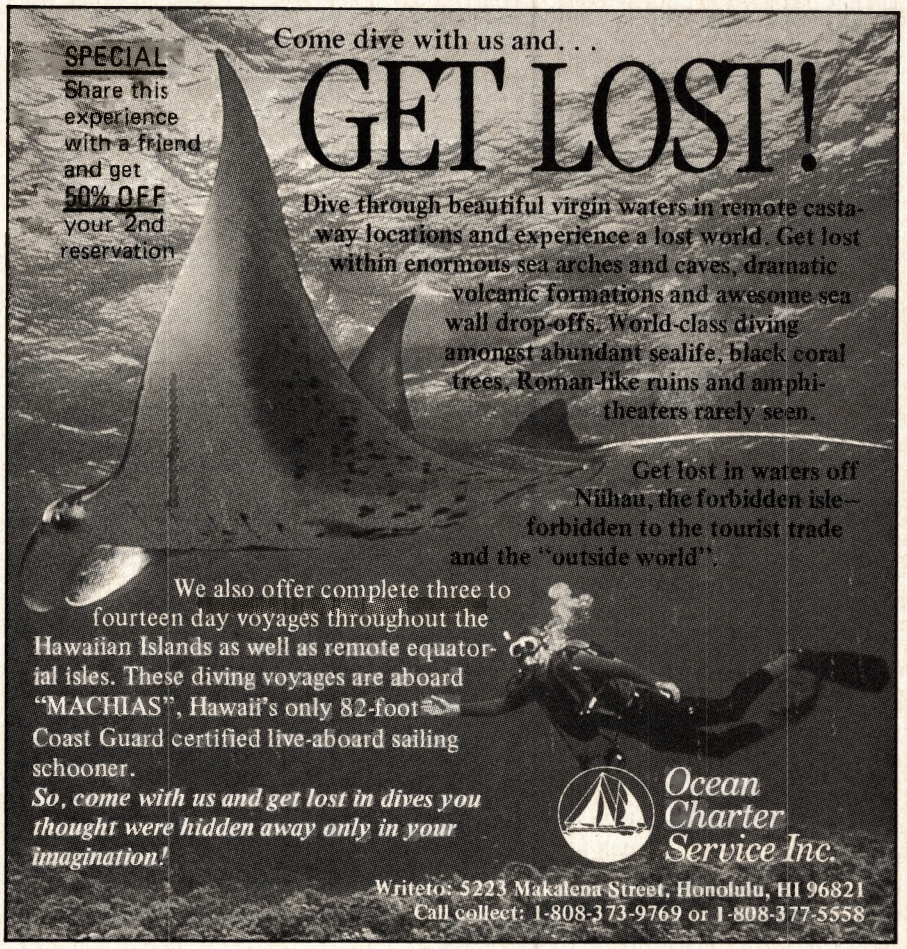
Every once in awhile a destination comes along that captures the imagination of the seasoned diver. Cayman's East End and the Cayman Diving Lodge make up that kind of place. Just as important as the lodge's attitude toward serious divers and the boats/services is the East End environment. It offers an underwater frontier that allows for mystery and adventure. It is my prediction this place will grow and mature into a great new buzzword within the diving community—a resort that has the atmosphere and diving attractions to appeal to divers wanting something different. A special thanks is owed to Ron, Kathie, Pat and all of the staff at Cayman Diving Lodge for giving me back the Grand Cayman I fell in love with years ago.

The Cayman Diving Lodge currently has 16 rooms for 32-40 visitors. Information on packages, including the new Cayman Dream package with Cayman Airways, and Hytha/Heindl photo or video courses, is available from AirTour Universal, 241 E. Commercial Blvd., Ft. Lauderdale, FL 33334. Telephone U.S. toll free (800) 327-8223; in Florida (800) 432-8894. The local Ft. Lauderdale number is (305) 491-0333. Contact the Cayman Diving Lodge at P.O. Box 11, East End, Grand Cayman Island, British West Indies; phone (809) 947-7555.

SPANISH COVE DIVE BOAT FLEET

Spanish Cove Resort on Grand Cayman, British West Indies has added two more dive boats to its fleet. The new *Spanish Diver* and *Treasurer Diver* are 42 foot fiberglass deep-V diesels, custom built by Hulls Unlimited East to the design specifications of resort owner Jack Peeples and dive operations supervisor Harry Ward. Able to cruise in excess of 18 knots, these boats will quickly and comfortably transport divers to a variety of North Wall locations, Tarpon Alley and the whole range of popular West End dive sites. The Spanish Cove fleet now consists of five vessels to handle hotel guests, dive groups and day divers with maximum comfort. For further information or reservations, please contact Spanish Cove Resort at (800) 231-4610 or (305) 381-9954.





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TECHNIFACTS

(Continued from Page 22)

causes steep banks to develop or sand/mud to be deposited and, sometimes, to be washed away.

Generally, visitors to the impounded waters of a dam see those waters as a placid expanse that will serve as a boating or diving playground. But the impounded waters are not static. There are currents, although these are not of the speed and force of a wild river. More important to the archaeologist is the change in the water level while drawing down the water for irrigation or raising it during flood control. These changes allow dynamic forces to erode not only the shoreline of the impounded lake but also any archaeological resources subjected to the interaction of the forces of currents, wind driven surface waves and silting and exposure to air. It should be noted that the pattern of wind and ancient river currents that created the alcoves in which many of the Anasazi sites are found, continue to cause erosion of those sites, particularly during flooding and draw-down periods for irrigation or flood control.

ANASAZI FINDINGS

The findings of divers sent down in an attempt to better manage the resources in the Anasazi sites will be discussed briefly. Similar, but sometimes less and sometimes more extensive, findings were made at sites in other impounded waters behind dams across the country.

Technical report No. 7 of the *National Reservoir Inundation Study* entitled *Preliminary Experiments in the Structural Preservation of Submerged Anasazi Units* was prepared by Larry V. Nordby of the Division of Anthropology, National Park Service. Most of his report deals with work done along the Colorado River in the Glen Canyon National Recreation Area in Arizona and Utah in waters impounded by the 700 foot high by 1,500 foot long Glen Canyon Dam in Arizona just south of the Utah line.

Note: Italicized findings or descriptions indicate areas or objects of concern by Technifacts for the safety of any diver who may choose to explore certain types of submerged sites.

Prior to, and during, the construction phase of a dam, archaeological survey and salvage work is conducted to determine the importance of the cultural resources that will eventually be inundated. Such was the case in the Glen Canyon area. Nordby reports, "Between 1957 and 1964, an extensive survey and excavation program was conducted to salvage data from sites which would be adversely impacted by the rising waters of Lake Powell. Approximately 900 sites were recorded by crews traversing the rugged canyons of the Colorado River

(Continued on Page 130)

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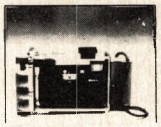
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and its tributaries. Large numbers of several site classes were situated in the aforementioned alcoves and many of these *remain characterized by still standing, wet-laid masonry walls and intact roofs*. The later are composed either of the *alcove ceiling or logs, sticks, and other fibrous packing covered with mud*."

The report continues, "A brief digression into the preservation characteristics of these sites is necessary here. First, the materials of which they (the Anasazi sites) were constructed are relatively durable when left undisturbed by moisture, but proceed down the path toward entropy once violated by water from any source. For example, once inundated, the Navajo sandstone of the Glen Canyon area is affected chemically, producing a bathtub ring which identifies the prior high water mark when the waters recede. This 'ring' is a calcium carbonate rich deposit containing quantities of such materials as blue-green and green algae in a flocculated silt matrix. Exposed surfaces of this ring are *extremely friable and compressive strength tests show substantial mechanical strength loss after inundation*."

Another condition reported by Nordby was that inundation results in almost complete mortar dissipation through softening and separating of the component soil particles. "As the plastic and liquid limits of these mortars are reached and exceeded, *the weight of the wall causes the wall to topple, even in the absence of current or wave activity*."

Some inherent faults in the building craftsmanship of the Anasazi *also tend to lead to early failure of a structure*. Seldom were their walls built vertically plumb. These and other structures were sometimes built on boulders or stone formations that themselves were not stable and, sometimes, walls were thicker at the top than at the bottom. *All of these are potentially hazardous in the presence of a diver working in the site*.

According to Nordby several natural forces tend to adversely affect sites, with wind-generated waves and boat wakes being the single most destructive environmental concern. The rate of water impoundment may affect the stability as does fluctuating water level.

Human forces also cause adverse impact. People who are seriously interested in the culture of the Anasazi and in archaeology, but who have received no briefing in the care of sites, are usually oblivious to the effect their presence has. This is particularly true when divers invade inundated sites. Air bubbles, flippers and movement of the diver through the site may cause considerable adverse impact. *Walls may tumble, roofs cave in, stone slabs may shift and silting*

may reduce visibility to near zero.

Simple inundation and resulting natural forces can cause almost complete destruction of an important site. One example of this is a site called the Gourd House. Prior to impoundment it was a beautiful structure in a deep alcove. After rising water inundated the site and after the water receded to a level below the structure, it was found that most of the wall had collapsed. This is more likely to occur after reflooding when the water level in the dam again covers the site.

Some structural work has been done by archaeologists in an effort to preserve sites. Some of this was done prior to inundation; some, after flooding, by diving archaeologists. These tests were designed to mitigate the effects of adverse natural impacts as well as the structural problems in the original building of the sites by the aboriginals. Some walls were stabilized with epoxies; others were treated to prevent deterioration.

Ongoing efforts by underwater archaeologists and managers of the parks and sites to educate visitors in the care of structures seems to bring some favorable results. The use of police patrols to deter vandalism has been only marginally successful and will probably remain so. At this time it seems best results may be obtained through education of the public, both topside visitors and underwater explorers, in the importance of preservation of sites in an undisturbed condition.

Almost from the beginning of diving for sport 40 years or so ago, divers have successfully resisted efforts to legislate all diving activities, including safety, education and various hobbies. The reason they have been able to do this is that divers must be responsible individuals to stay alive in their chosen environment. They are capable of self-regulation. It is hoped that self-regulation will continue and that the industry in its entirety can become a trusted and respected part of underwater exploration. It is extremely exciting and rewarding to be a part of and a contributor to underwater archaeology.

In recent correspondence from Daniel J. Lenihan, Chief, Submerged Cultural Resource Unit, United States Department of the Interior, National Park Service, Southwest Region, Santa Fe, New Mexico, several concepts of underwater archaeological work and important safety hints for divers were presented that I should like to share with Technifacts readers. His letter and correspondence from other dam divers will be presented in next month's Technifacts. Join us for more safety hints for the dam diver.



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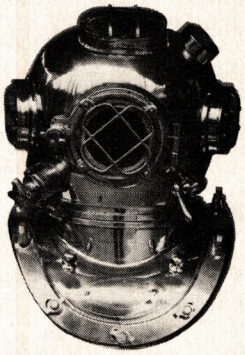
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METZELER BRIGANT LS

(Continued from Page 67)

any rigid wooden members. The rear floorboard extends past the transom into two horizontal water level pockets used as trim tabs. They are designed to reduce turbulence in that area when the boat is in transition to a planing mode. There are two bilge valves on the ends of the tabs. Unfortunately, the trim tabs preclude the use of landing wheels.

The bow section of the Brigant LS curves upward radically and the outer pontoons taper toward the stem. Lateral stability for the boat is provided by an inflatable keel that gives the hull a deep-V bottom configuration. A bow step is included for convenient entry, tied off by the bow line. Chafing-protection strips in this section double as attachment rails for an optional bow canopy with inflatable support and windscreen.

METZELER BRIGANT LS

Overall length	13′3″
Overall width	6′
Capacity	6
Payload	1,474 lbs.
Recommended horsepower	50
Weight	183 lbs.
Packing dimensions:	
boat skin	2′11″ x 2′4″ x 11″
floor	4′3″ x 2′11″ x 10″
Number of air chambers	3
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lateral tubes	4.2 psi
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Number of floorboards	5 + transom
Color	Yellow
Suggested retail price	$1,790

We left the dock with approximately a 750 pound load excluding the 35 horse power engine. In the calm waters of the bay our boat seemed to skim across the surface with little effort. Two persons sat on the seat and one on the pontoon. Visibility was somewhat restricted by the high bow. On the open ocean I was impressed by the smooth ride of the tight hull as we headed into a rather small swell. We remained relatively dry owing to good spray deflection away from the boat. Although the seat and steering control made for a rather luxurious ride, they impaired our ability to see and remove kelp that often fouled the propeller. We paused for me to test boat entry. I would suggest that the optional set of lateral nylon lines be added for tying off tanks and gear. The freeboard was low enough so that I could propel myself into the boat using a swift kick following removal of tank and weightbelt. As we headed back, the relatively high transom did a good job of keeping water from the following sea out of the boat.

Based on performance and economy I would definitely recommend the Metzeler Brigant LS for two to three divers. It will get you to the dive site swiftly and there is plenty of room for dive gear. Assembly time is estimated to be 20 minutes. The basic boat includes a set of oars, hand pump, repair kit and boat polish. Accessories beyond the engine, floor carpeting and lateral lines are not necessary. A limited two year warranty covers all components against manufacturing defects. Service is available from a network of dealers in most major cities.

DIT UPDATE

Several changes have taken place at Divers Institute of Technology (DIT) in the last few months:

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2. Allen B. Nesbitt was recently added to the staff as a full time instructor. His diving experience started in 1957 when he completed the Navy's Deep Sea Diving School in Washington, D.C. He retired from the Navy as a master diver.

3. Sandi Chitty recently became DIT's new admissions director. She has several years' office experience. She is currently finishing up her B.A. degree in psychology.

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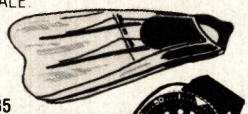
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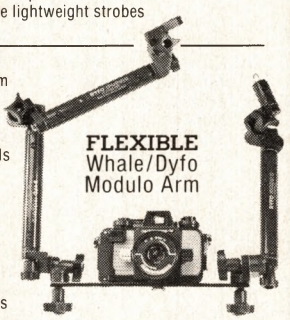
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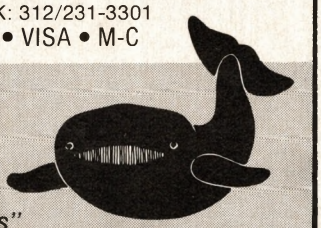
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WRECK FACTS

(Continued from Page 12)

versation with a Natural Resources officer. We were amazed to learn that even if we found the snowmobile or anything else, we could not claim it. By Ohio law anything recovered in public waters becomes the property of the Sheriff's Department. If authorities can't locate the owner, they auction off the salvaged items to the highest bidder. The finder can't even recover his salvage costs. Since laws vary in the states, divers should become familiar with them before encountering a discouraging situation such as ours."

Cindy Crawford, Duluth, Minnesota, sent me a copy of Lake Superior Port Cities, a quarterly journal of contemporary and historical events around Lake Superior. A publication of high quality, the journal—in addition to general human interest articles—includes stories of interest to divers and shipwreck enthusiasts. As a result of positive feedback from divers, the publisher printed an informative 40 page booklet, *Shipwrecks of Lake Superior*. That was more than two years ago and a second Superior shipwrecks special will be out soon. For information on both shipwreck booklets or Lake Superior Port Cities Journal, contact Cindy Crawford, Lake Superior Port Cities, Inc., Suite 510, Meierhoff Building, 325 Lake Avenue South, Duluth, MN 55802.

Mike Andriechack, New Stanton, Pennsylvania, writes that he is a diver and collector of World War II military souvenirs, particularly U-boat artifacts. He would be interested in corresponding with other divers who have the same interests. Mike has documented many sunken U-boats and has some interesting books to share with other Nazi submarine researchers. Contact Mike at P.O. Box 46, New Stanton, PA 15672.

One of the best books about U-boat action in World War II is *U-Boats Offshore* by Edwin P. Hoyt, Jove Publications, 200 Madison Avenue, New York, NY 10016. A 40 chapter paperback, it details authentic accounts of how the Germans terrorized our East Coast in the early part of the war until our defenses rallied and mobilized heroically. The Nazi menace was thwarted and hunters became the hunted. Chapters include the sinkings of allied ships *Bedfordshire*, *Jacob Jones*, *Athena*, *Allen Jackson* and others. Details of German losses (the *U-85*, *U-701*, *U-382* and *U-94*) describe how we drove the enemy away from strategic shipping lanes. *U-Boats Offshore* is in its fourth printing and available in most book stores or directly from the publisher.

Bill Wilson, president, California Wreck Divers, sent me a copy of his club's newsletter, Porthole, which keeps members abreast of future dives and events.

The club schedules dives on the *Star of Scotland*, *Valiant*, *Gregory*, at Honda and on other California wrecks. Meetings are informative and an annual banquet features a noted speaker. Last year's guest was the popular author/diver, Clive Cussler. For more information about California Wreck Divers contact Pat McFerran (213) 390-5171 or write California Wreck Divers, P.O. Box 10693, Marina del Rey, CA 90291.

Safe diving to all. Be sure to include a stamped, self-addressed envelope when writing. Ellsworth Boyd, 1120 Bernoudy Rd., White Hall, MD 21161.

NIKONOS DEALER INSTRUCTIONAL PACKAGE

A Nikonos Dealer Instructional Starter package, the first of its kind, has been developed by Nikon Inc. and is now being offered to dealers. It is designed to facilitate underwater photography instruction programs conducted by dive stores for customers ranging from novices to experienced divers.

This unique package will consist of a Nikonos V camera, W-Nikkor 35 mm lens, SB-103 Speedlight, Pelican carrying case and book, *The Nikonos System: Principles of Underwater Photography*, by Steve Frink.

The book is intended to enable a diver of any capability to obtain satisfactory results with the Nikonos camera immediately, without going through a lengthy and expensive trial and error process. "As a result," stated Frank Fennell, Nikonos Products Department marketing manager, "the diver will move rapidly into more complex photographic concepts and begin to advance to higher levels of creative accomplishments.

"The instructional starter package now provides the scuba retailer with an exciting new sales and after-sales tool—and we expect that it will bring many more underwater enthusiasts into the world of photography," Fennell noted.

NEW MIXED-GAS PROGRAM

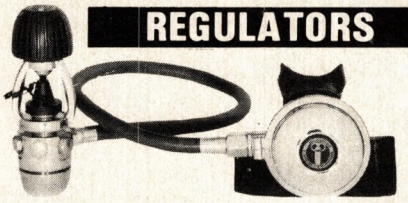
The Ocean Corporation in Houston has started a new commercial mixed-gas diver training program designed for air only diving school graduates and working commercial air divers who need mixed-gas certification to work in the offshore oilfield diving industry.

The new program is three weeks long. The first course started on April 15, a new course starts every five weeks thereafter.

Ocean Corporation president Larry Cushman stated that graduates of the new program will be certified in commercial mixed-gas diving and will be eligible for job placement assistance with the Gulf of Mexico commercial diving companies.

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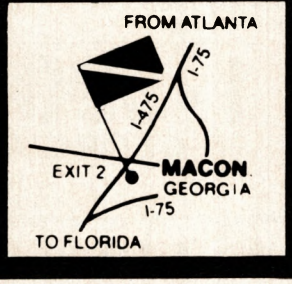
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PRO EKTACHROME 64

(Continued from Page 19)

the time of sale. (If the film is in an unrefrigerated showcase, it is no longer professional film—it is now regular consumer film.) Consider buying a 20 roll pack. All of the rolls within this package will be virtually identical in color balance and film speed. Also, many shops give a quantity discount for 20 rolls. Before using the film, look at the instruction sheet for the actual film speed.

Refrigerate EPR as soon as possible. When flying to a tropical location, wrap the frozen film in a plastic bag and towel and pack it at the last minute. The film will still be cool when you arrive. You can store EPR for a week or ten days at normal room temperatures (about 70°F), without a noticeable loss of quality. However, avoid excessive heat with EPR or any other film.

Process exposed EPR as soon as possible. We don't mean to imply that EPR is unstable; the sooner any color slide film is processed, the better the results. If you must store unprocessed film until your trip is over, put the cassettes back into the plastic containers as soon as you unload the camera and refrigerate the exposed film. If the opened film has been subjected to unusually damp, humid conditions, some photographers recommend placing the canisters and some desiccant inside a sealed plastic bag.

Professional Ektachrome 64 (EPR) is in 135-36 (35 mm format, 36 exposure cassettes) for $6.40 and in 35 mm 100 foot rolls for $43.27. Kodak processing for a 36 exposure cassette is $5.85. A 120 roll is $3.42 and a five roll pro pack is $17.10. A 220 roll is $6.84 and it is $34.20 for a five roll pro pack. For more information, contact: Eastman Kodak Company, 343 State Street, Rochester, NY 14650.

PADI FAST SALES

The introduction of PADI's FAST Sales System has created a new avenue of advancement for those seeking to make diving a full-time career. The heart of the FAST System is a five module sales training program, created especially for the retail dive store environment. By completing this program, career minded individuals make themselves more valuable to prospective diving employers, who generally consider sales training of equal importance to instructional ability. FAST sales training is also available through a number of PADI's instructor training centers, Five Star Instructor Development Centers and individual PADI course directors.

Professional Scuba Inspections

A New Training Program That Results In Extended Scuba Life

TEXT AND PHOTOGRAPHY BY BILL HIGH

The water we dive in, and the salts or trace minerals it contains, are not friendly to high pressure steel and aluminum alloy tanks. Corrosion, rough handling, excessive heat and careless maintenance can all take their toll. Frequent visual inspection of scuba tanks may greatly extend their service life by identifying potentially damaging conditions in time for a knowledgeable service professional to take counter measures.

PSI (Professional Scuba Inspections) is a newly introduced national training program for visual inspectors. It is designed to increase the knowledge of those people who formally inspect scuba tanks. In the past, experience with diving gear was often the only prerequisite for visual inspectors. Too little attention was given to learning just what a visual cylinder inspection (VCI) was supposed to address and to what standards judgements should be made.

Several tragic tank explosions in recent years—such as the two repainted aluminum tanks described by Paul Tzimoulis in his December 1984, SKIN DIVER editorial, and a steel cylinder that exploded in Japan, killing a young diver—are examples of devastating injuries.

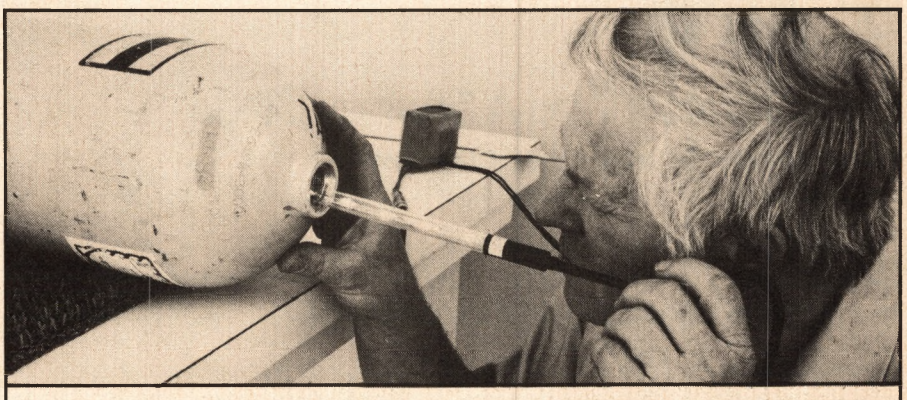
The five hour PSI visual cylinder inspector training course was researched for two years before I taught the first class in 1982. I discovered early that reference material commonly used by active inspectors, including the Compressed Gas Association C-6 guide and the University of Rhode Island study, while vital components of the needed information package, were totally inadequate to explain the appropriate inspection steps.

In 1983, Bruce Higgins, a Seattle ocean engineer, joined with me to further develop the training course and follow the wise recommendation of the Compressed Gas Association. In the beginning of its C-6 pamphlet, the CGA urges special users of high pressure cylinders to develop appropriate guidelines based upon their special knowledge of that use. We divers use scuba tanks in ways hardly imagined by the gas industry as a whole. We repeatedly dunk them in a corrosive medium. Also, we cut through their protective coatings repeatedly on coral, rocks and shells. On boats tanks often clank together in harmony with the swell.

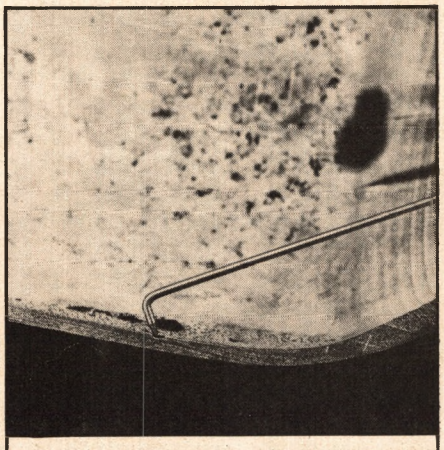
Visual inspection of scuba tanks is required by the U.S. Department of Transportation (DOT) as part of the five year hydrostatic test. Our industry practice of an annual inspection is a fine effort toward self policing. Unfortunately, the DOT didn't really tell us how to carry out the inspection nor to what we should compare our findings.

The PSI training provides an 18 step inspection guide and reference documents. An inspector following the guide will safely handle the tank, evaluate appropriate features on the exterior, interior and valve as well as prepare a permanent record of findings. The entire 18 steps and documentation can be completed in as little as five minutes.

We train inspectors to remove all tank accessories, examine for and measure dents, bulges, gouges and general pit and line corrosion. Also, they search for indicators of abuse, excess heat and poor maintenance and record findings.



Good illumination is essential for the inspector to accurately assess the condition of the interior of the scuba tank. Several custom lamps are available. The PSI course provides an 18 step guide and reference documents that allow an inspector to properly handle a tank, evaluate its interior and exterior and record the findings.



A cross section of a steel tank allows a unique perspective on how a probe can evaluate a pit in the material that might be hard to check visually.

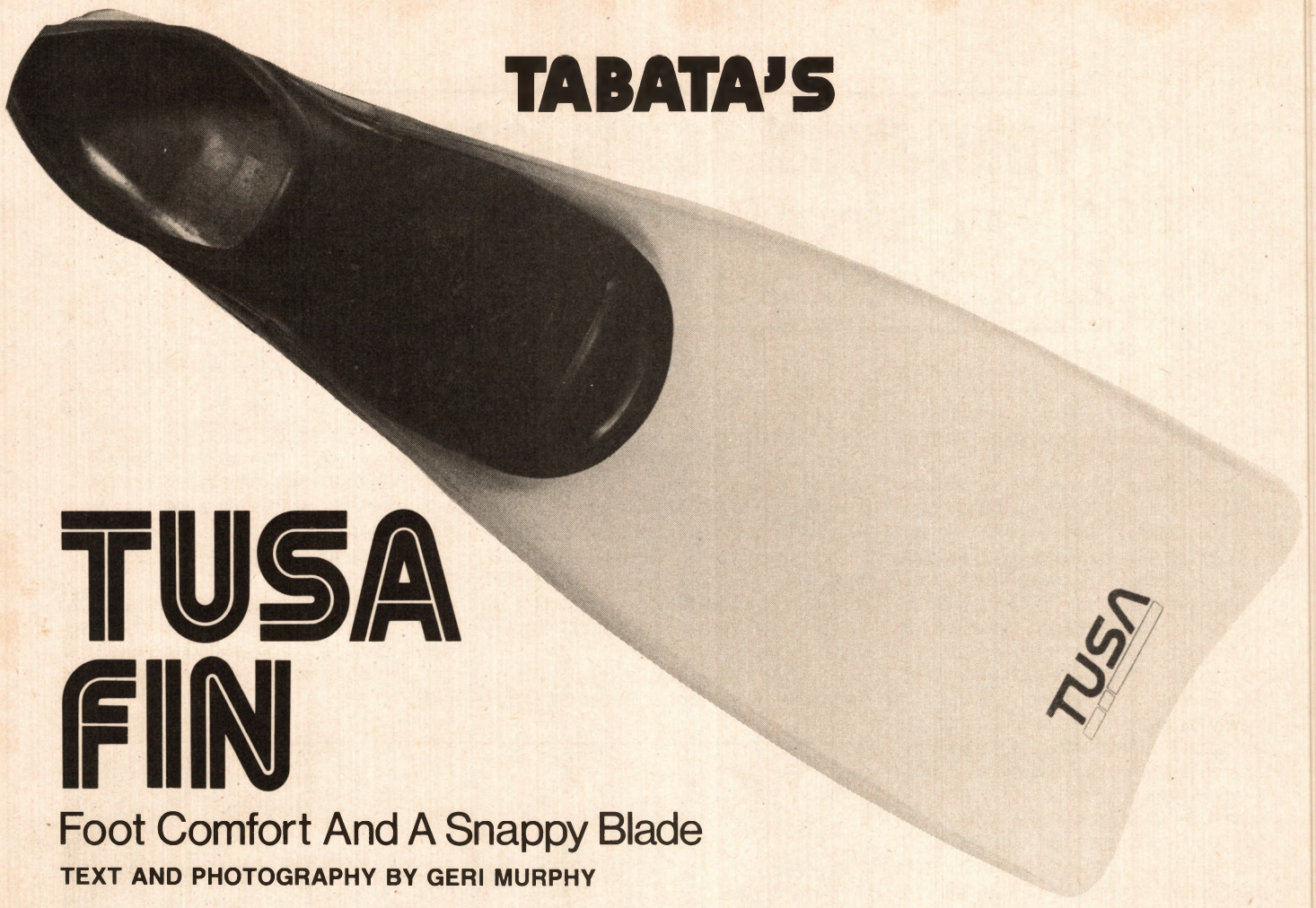
The valve is examined for damage or thread wear. Frangible (burst) disc retaining nuts are inspected for proper type and replaced if necessary. Recall items are replaced as are deformed O-rings.

Then comes an examination of the tank interior, the most difficult part of the inspection. Corrosion type, magnitude and pit depth are compared to charts.

Few untrained visual inspectors understand important facts about the tank wall and the consequences of erosive processes. Typically, the most common steel scuba tank begins as a 23 1/4 inch (circumference) tube of 1/4 inch (.250 inch) thick steel plate. As it is drawn into its final shape, the wall thickness is reduced to something between .165 and .190 inch, much thinner than many believe.

Since both corrosion and tumbling contribute to wall loss, the inspector must

TABATA'S



TUSA FIN

Foot Comfort And A Snappy Blade

TEXT AND PHOTOGRAPHY BY GERI MURPHY

TUSA? What's a TUSA? TUSA is an acronym for the American distributing company, Tabata USA. It is a subsidiary of the Tabata Company of Japan and the people who provided inspiration for this unique product.

TUSA is also the name of an entire line of new diving equipment. It is some of the prettiest and most colorful dive gear in the world today. TUSA products include masks, snorkels, fins, BC jackets, etc.

What makes TUSA products so distinctive is their colors: They come in vibrant pastel shades of blue, pink and yellow. (There is also black.)

The TUSA Full Foot Fin (catalog #SF-4000) is one of Tabata's most recent introductions in the diving field. It is making its debut this summer. It is a lightweight fin that combines full foot pocket comfort with a snappy plastic blade. The end result is a high-efficiency fin ideally suited for snorkeling, tropical resort diving and swimming pool use.

In addition to performance, the fin looks great and is color coordinated with the TUSA blue mask and snorkel. You can even purchase a matching blue knife, gloves and BC jacket if you desire.

The fin starts with a well designed full foot pocket of a blue composite material that is a blend of plastic and rubber. The material is soft and supple. It molds to the diver's foot, preventing callouses and sore spots.

The sides of the foot pocket are cut low enough to avoid chafing at the ankle, yet the heel cup is deep enough to provide a firm grip on the foot. The pocket is open at the toe, to provide foot comfort during use. The open toe area is ribbed for extra strength; to prevent tearing or ripping of the foot pocket.

The blade of the fin is a clear, low density polyethylene material that is impervious to ozone and ultraviolet damage. This ultra-light material gives the fin its feathery yet snappy performance. The end result is a fin that weighs less than conventional neoprene fins, yet provides more thrust. There is less leg fatigue and, obviously, a happier diver.

The TUSA full foot fin is available in sizes ranging from 3-4 to 11-12. One interesting twist to the TUSA fin is that it is actually made in Italy. Tabata has gone multi-national.

SKIN DIVER's test of the TUSA full foot fin provided proof that it performs just as well as it looks. They were a joy to use in the pool and I plan to pack a pair of these nifty fins for the next trip to the Caribbean. They are comfortable, lightweight and provide plenty of thrust.

The TUSA full foot fin retails from $15-26 a pair, depending on size. For more information about the TUSA fins and complete line of TUSA equipment, see your local dive store or contact; Tabata USA Inc., 2380 Mira Mar Ave. Long Beach Business Center, Long Beach, CA 90815.

TANK INSPECTION TRAINING

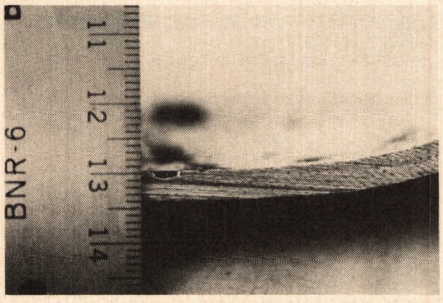
estimate the amount of wall loss and compare that loss to minimum in-service standards. Many present inspectors believe corrosion pits up to 1/16 inch deep in steel tanks are acceptable. That is not true! We show inspectors how to construct a pick/probe tool and use it, with reference tables, to judge pit corrosion.

Repeated tumbling of either steel or aluminum tanks to clean their interior can remove several thousandths of an inch of good material. While the hydro test is intended to detect excess material loss, its five year interval may not always be adequate. Our experiments show that aluminum oxide tumbling aggregate, an excellent tank cleaning material, can reduce wall thickness at four times the rate of pea gravel. Therefore, tumbling should be done conservatively and only when necessary to adequately inspect the interior surface.

Tank owners should not assume a hydrostatic test is the only appropriate evaluation. Certainly it is an essential and required part of the steel and aluminum tank care package. This test will reveal certain, but not all, deficiencies. It has been reported that some tanks that passed a hydrostatic test failed to hold air shortly thereafter.

The skilled visual inspector can discover actual and potential problems not addressed by the hydrostatic test. The VCI should be conducted at least annually and under special conditions, including frequent use, damage or interior moisture, it should be more frequent.

Both the National Oceanic and Atmospheric Administration (NOAA) and National Association of Underwater Instructors (NAUI) recognize the PSI course and regularly co-sponsor classes in selected cities. While NOAA classes are normally only available to government inspectors, NAUI encourages participation by all active and would-be inspectors regardless of their affiliation. Those wanting to receive a calendar of scheduled classes should contact NAUI, P.O. Box 14650, Montclair, CA 91763, or PSI, 6531 NE 198th Street, Seattle, WA 98155.



A close-up on the pit in the tank shows how deep it is. The tank failed the VCI.

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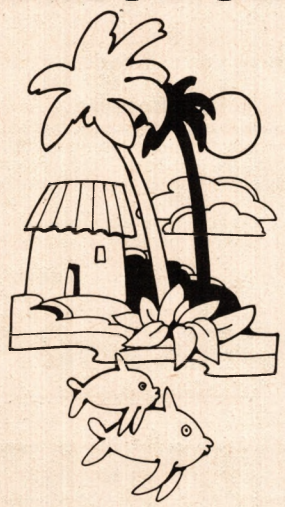
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Advertising rates: $141.00 for three consecutive ads, $240.00 for six consecutive ads, $360.00 for a full year. DEADLINE: 28th of 3rd month prior to publication. PAYMENT MUST ACCOMPANY COPY. Send all material to: Diver's Directory, c/o Direct Response Advertising, P.O. Box 69910, Los Angeles, CA 90069.

ALABAMA

MCWHORTER ENGINEERING CO. 205/836-2814
P.O. Box 9014, Plant 1053, Gadsden Rd., Birmingham, AL 35213
Rebuilts, parts, accessories, ASME coded.
HP air compressors, units, systems, since 1952.

ARKANSAS

LYNN'S SKI 'N SCUBA, INC. 501-666-DIVE
1220 Westpark Dr., Little Rock, AR 72204
50' dive boat, equip. rentals, Arkansas' only scuba dome
featuring 14' deep diving pool. PADI instr., dive trips.

RICK'S PRO DIVE'N SKI SHOP, INC. 501/753-6004
2323 Poplar St., N. Little Rock, AR 72114
Arkansas' only PADI 5 star training facility w/indoor pool. Dive
boat, dive vacations. We teach 9 PADI specialties.

CALIFORNIA

AQUATICS OF SANTA BARBARA 805/964-8689
5370 Hollister Ave., #3, Santa Barbara, CA 93111
Channel Islands Charter, rentals, sales, repair, air.
Instruction: SSI, NAUI, PADI beginning to Divemaster courses.

ARGO DIVING SERVICES 213/510-2208
79 Canyon Terrace, P.O. Box 1201, Avalon, CA 90704
Guided underwater tours and instruction by
Jon Hardy on Catalina Island. Free information.

BIRNS OCEANOGRAPHIC, INC. 213/462-8868
1010 N. Highland Ave., Los Angeles, CA 90038
Underwater photography equipment only, sales and rentals,
stills and motion pictures. Sam Parker, Director

CATALINA DIVERS SUPPLY 213/510-0330
Avalon, Catalina Island, CA 90704
Rentals, sales, air, 2 locations.
Pleasure Pier and Avalon Underwater Park.

GUCCIONE'S SCUBA HABITAT 714/594-7927
3220 Brea Canyon Rd., Diamond Bar, CA 91765
Sales, air, classes, PADI facility. Rentals, dive charters.
'See Vue' & 'Atlantis' dive boats. 32' Radon for small groups.

OPENWATER HABITAT, INC. 714/633-7283
417 S. Main, Orange, CA 92668 CA 800/334-OHMS
Centrally located. PADI 5 Star instructor devl. centre.
Beginner to instructor courses, pro rntls/sls/svs, dv. trips.

PASADENA DIVERS WEST 213/796-4287
2695-A E. Foothill Bl., Pasadena, CA 91107
Sales, service, air, PADI, NAUI, instruction.
Rentals, boat trips, underwater photography, tours.

PROFESSIONAL S.C.U.B.A. REPAIR 818/769-1484
5725 Cahuenga Bl., No. Hollywood, CA 91601
Professional repair is our only business.
Servicing all makes and models of equipment since 1961.

SCUBA DUBA DIVE 818/881-4545
7126 Reseda Bl., Reseda, CA 91335
Mon.-Sat.: 10-7. Underwater photo specialist.
Boat trips, instruction, sales, service, rentals.

TRI-VALLEY SCUBA SCHOOL, INC. 415/828-5040
21310 San Ramon Valley Bl., San Ramon, CA 94583
Scubapro Dealer & full line of major brands.
The East Bay's 'full service' pro dive store.

WATER EDUCATION TRAINING (WET) 619/578-3483
8176 Miramar Rd., San Diego, CA 92126
YMCA, PADI, NAUI, resort courses through instr. Free weekly
scuba refresher courses. Full service vacation facility. Get WET.

CONNECTICUT

JACK'S DIVE CENTER, INC. 203/747-3170
466 East St. (Rt. 10), Plainville, CT 06062
Our 10th year of full time service to divers.
Sales, service, instruction, rentals, Cayman specialists.

ORBIT MARINE SPORTS CENTER, INC. Open all year!
3273 Fairfield Ave., Bridgeport, CT 06605 203/333-DIVE
Foot of Broad St., Stratford, CT 06497 203/377-6969
Sales, rentals, air, service, NAUI, PADI instr., charters.

THE DIVING BELL 203/775-3573
782 Federal Rd., Brookfield, CT 06804
Open all year. 5 Star PADI, instruction, equipment rental, hydros,
photo, repairs, gifts. Travel with us. Local & island travel planned.

UNDERWATER SWIMMERS, INC.
526 Main St., West Haven, CT 06516 203/932-0258
1038 Farmington Ave., Kensington, CT 06037 203/828-3641
Discount prices, courses, rentals, repairs, air, hydros.

FLORIDA

AMERI DIVE 305/395-4407
7166 Beracasa Way, Boca Raton, FL 33433
Del Mar Shopping Village, corner Powerline & Palmetto.
Instr., sls., rental, svs., air, travel, resorts, Scubapro, PADI.

AQUANAUT SCUBA CENTER, INC. 904/837-0359
24 Hwy. 98, P.O. Box 651, Destin, FL 32541
Dive boat 'Aquanaut', reef, wreck, night diving, private & group
instruction. NASDS & PADI, resort & open water courses.

BRENT FEINMAN'S SCUBA WORLD 'STAY WET' 305/587-DIVE
3932 Davie Bl., Ft. Lauderdale, FL 33312 305/587-7234
PADI facility, air, sales, service, rentals, dive charters,
reef trips. All levels of cert. private & group lessons.

CRYSTAL LODGE MOTEL & DIVE CENTER 904/795-6798
US 19 N., P.O. Box 456, Crystal River, FL 32629
Manatee & spring diving, boats, equipment rental.
Heated pool, seafood, bar, rooms at low prices.

DEEP SIX DIVE & WATERSPORTS Beach Diving Report
1550 Old Dixie, Vero Beach, FL 32960 305/562-2883
Closest beach dive to Disney, reef within 50 ft. of beach.
Lobster, wreck, treasure, PADI 5 star IDC full svs. store.

DIVER'S DEN/PNEUMATIC SYSTEMS, INC. 904/871-4777
4720 E. Bus Hwy. 98, Panama City, FL 32404
Sales, rentals, service, fast charter boats, 6-15 passengers
Instr. NAUI, PADI. Compressor sales, service, maint., overhaul.

DIVERS UNLIMITED 305/981-0156
6023 Hollywood Bl., Hollywood, FL 33024
Awarded #1 training facility by PADI. All brands, whsl/rtl, daily boat
trips, repair, rental, classes, travel. 5 Star PADI training facility.

DIVERS UNLIMITED/FORT LAUDERDALE 305/524-4862
440 Seabreeze Bl., Ft. Lauderdale, FL 33316
Daily boat trips, training dives, classes, retail-all brands, leisure-
wear, rentals. Packages w/Days Inn. 5 Star PADI training facility.

DIVERS WORLD 305/844-1510
Mail: 200 Tacoma Ln., PBS, FL 33404
Daily dives, group rates, rentals. One day
Bahama trips. Coast Guard approved 34' boat.

DIXIE DIVERS, INC.
1717 S. U.S. 1, Ft. Pierce, FL 33450 305/461-4488
1843 S.E. Federal Hwy., Stuart, FL 33494 305/283-5588
PADI 5 Star facilities, open 7 days, charters.

FANTASEA SCUBA HEADQUARTERS 904/837-0732
P.O. Box 63, #1 Hwy. 98, Destin, FL 32541
PADI 5 Star facility, D.V.I. resort destination.
Sales & service, charters, instruction, rental, air.

FORCE-E, 1399 N. Military Trl., W. Palm Bch., FL 305/471-2676
877 E. Palmetto Pk. Rd., Boca Raton, FL 305/368-0555
2700 E. Atlantic Blvd., Pompano Beach, FL 305/943-3483
2104 W. Oakland Park Blvd., Ft. Lauderdale, FL 305/735-6227

GINNIE SPRINGS, INC. 904/454-2202
Rt. 1, P.O. Box 153, High Spring, FL 32643 800/874-8571
Six 72° clear blue springs, camping, canoeing.
Complete resort dive facility.Cavern instruction.

GULF STREAM DIVER SCUBA CHARTERS 305/965-7878
2315 Caroma Ln., West Palm Beach, FL 33406
Palm Beach daily reef & wreck dives, pro. charters,
Bahama boat trips. 2 new USCG 38' & 41' cust. dv. boats.

HYDROSPACE DIVE SHOP 800/874-3483
3605-A Thomas Dr., Panama City Beach, FL 32407 904/234-9463
The Gulf Coasts' largest and most experienced dive service.
5 boats 46', 42', 40', 24'. Full service facility.

ICHETUCKNEE RIVER DIVE CABIN
Branford, Florida area (near Ginnie Springs).
Sleeps 6, 2 bath, kitchen, A/C
Call 404/487-5211 day or 404/487-5055 nite

LAUDERDALE DIVER 305/GO-SCUBA
1334 S.E. 17th St., Ft. Lauderdale, FL 33316 "on the Causeway"
Complete master diver program. PADI distinguished service
award. Instr., sales, service, air, photo, trips. Widest selection.

MAC'S SPORTS 813/442-9931
2126 Drew St., Clearwater, FL 33575 813/461-7160
One of the world's largest diving stores & school.
Pool on premises, local & Caribbean trips.

MANATEE HEADQUARTERS 904/795-2776
P.O. Box 124, Crystal River, FL 32629
3 day certification, Manatee tours.
Full service dive shop, special Sheraton Motel rates.

NORINE ROUSE SCUBA CLUB OF THE PALM BEACHES
4708 N. Dixie Hwy., West Palm Beach, FL 33407 305/844-2466
A membership club for certified divers.
Dive trips 6 days a week.

PLANTATION INN MARINA 904/795-5797
P.O. Box 1093, Crystal River, FL 32629.
Instruction, rentals, boats, canoes, pkg. deals, pvt. Manatee obser.
deck and air sta. at Divers Giant Spring. Golf, tennis, 150 rooms.

PROFESSIONAL DIVING SCHOOL/CHARTERS OF FLORIDA
Bahai Mar Yachting Center,Ft. Lauderdale, FL 33316
Basic-divemaster training/specialties-night, deep, wreck.
Daily reef & wreck dives. 305/761-3413 800/772-DIVE

'SCUBA TOO' CAPT. JOE SCHIRCK 305/989-5813
Ft. Lauderdale's oldest continuing dive operation. Pet &
feed Oliver the Moray Eel featured on "Those Amazing Animals".
PADI instructor on every dive, 6 persons maximum.

SEAPRO SCUBA CENTER 305/844-DIVE
3619 Broadway, Riviera Beach, FL 33404
PADI 5 Star facility. Sales, service, instruction,
rental, charters, air. Action sportswear.

SEAPRO SCUBA CENTER needs PADI instructors for full time
employment in Palm Beach store, Captains license and regulator
repair helpful.
3619 Broadway, Riviera Beach, FL 33404 305/844-DIVE

THE SCUBA SHACK, INC. 305/334-8808
2485 N.E. Dixie Hwy., Jensen Beach, FL 33457
The Treasure Coast's oldest full service dive shop.
PADI instruction, air, sales, rentals, repairs, trips.

VORTEX SPRING & CAMPGROUND, INC. 904/836-4979
Rt. 2, P.O. Box 18½, Ponce De Leon, FL 32455. Now ITC courses.
Sales, service, rentals, 5000 PSI air, canoe rentals, group lodging
dorms, RV hook-ups. Cavern & system dive. Gulf & Keys trips.

FLORIDA KEYS

AMERITRAVEL DIVING PACKAGES US & FL 800/551-4000
5900 SW 73 St. #204, S. Miami, FL 33143
Unique dive packages anywhere in the keys.
Custom tailored to any budget, individuals or groups.

AQUATIC FLOATING SEA COVE MOTEL 305/289-0800
12685 Overseas Hwy., Marathon, FL 33050
Budget rates, Summer $14-$29, Winter $19-$39 for two.
Private deep harbor & ramp on Atlantic. A#1 rooms and effs.

BAY HARBOR LODGE 305/852-5695
Rt. 1, Box 35, Key Largo, FL 33037 MM. 97.5
Best rates. Comfortable accommodations.
Great spot. Ask for brochures.

BUDDY'S DIVE SHOP 305/664-4707
P.O. Box 409, Islamorada, FL 33036 MM. 79.5 @ Bud 'n Mary's
Marina. Dive aboard our 40' 'Scuba Safari' & 34' 'Free 'n Clear'.
Daily trips to Alligator Reef & Coral Gardens. Pkgs. avail.

CAPT. CHAMBERS' TRIANGLE DIVE CHARTERS 305/451-1805
P.O. Box 2258, Key Largo, FL 33037
31' custom boat, 6 max. Free: guided dives, use of U/W camera.
Dive packages avail. Recommended by Undercurrents, 3/82.

CAPT. CORKY'S DIVERS' WORLD of Key Largo, Inc. 305/451-3200
P.O. Box 1663, Key Largo, FL 33037 MM. 99.5 U.S. 1 past Wendy's
Bahamas/Pennekamp, U/W video rental, snkl. w/dolphins, PADI instr.,
grp. rates, dive, snkl., sail, shell collect, spearfish. Best pkg. rates!

CAPT. GREG'S SCUBA-DO 305/451-3446
P.O. Box 2237, Key Largo, FL 33037 MM.100 @ 100 Marina
Dive Pennekamp, 34' boat, 6 max. Avoid crowded boats.
Enjoy personal service. We dive with you. Best dive pkg. rates.

CAPT. SLATE'S ATLANTIS DIVE CENTER 305/451-3020
51 Garden Cove Dr., Key Largo, FL 33037 MM.106.5 305/451-1325
Dive Pennekamp on 1 of 3 cust. boats. NAUI, YMCA, PADI, CMAS
instr. Air & rntls., grp. & multi-dv. disc., pkgs., gifts.

CONDO KEY LARGO — Call collect 813/939-3612
Moon Bay deluxe 2 BR, 1½ bath w/dock, sleeps 6. Near Pennekamp, dive centers, marinas and Largo cut. Scuba, snorkel, fishing, skiing. $395 per wk. Reserve early.

CORAL LAGOON RESORT AT THE DIVING SITE — 305/289-0121
Middle Keys, MM.53, 12399 Overseas Hwy., Marathon, FL 33050
Waterfront efficiency cottages, dockage, pool, tennis, bikes.
PADI dive shop, lessons, 3 boats, groups, spring/fall dive pkgs.

DIVE KEY WEST — 305/296-3661
'Carol J', P.O. Box 2842, Key West, FL 33045
Disc. room pkg. & grp. rates. Max. 6 divers.
Lobster diving & spearfishing, rentals, air.

FLORIDA KEYS DIVE & SKI, INC. — 305/852-4599
P.O. Box 391, Tavernier, FL 33070 — 6 pass. dive boats.
A PADI scuba train. fac. Checkouts, 4 day cert. course & all levels of instr. Spearfishing, shelling, watersports.

HALL'S DIVING CENTER & RESORTS — 305/743-5929
1688 Overseas Hwy., Marathon, Keys 33050
Guaranteed "Weather-Proof" reef trips and dive packages.
Lessons start every day. All major brands and credit cards.

HAWK'S CAY RESORT & MARINA — US 800/327-7775
MM 61, Marathon, FL 33050 — FL 800/432-2242
Tennis, pools, jacuzzis, reef trips, PADI. — 305/743-9000
Custom-built dive boats, air/equip. rental, instr., pkg. rates.

HOLIDAY ISLE DIVE & SWIM CENTER — 305/664-4145
P.O. Box 482, Islamorada, FL 33036 MM 84.5 — FL-800/432-2875
New dive boat. — US-800/327-7070
Group rates and scuba instruction.

KEY LARGO CONDO — 305/433-8073
3 BR., 1 1/2 Bath, completely furnished. — 305/546-2275
Marina, saunas, tennis, pools, 2 mi. Pennekamp Park.
Great diving, fishing, sailing. Special summer rates.

KEY LARGO LUXURY ACCOMMODATIONS — 305/255-4556
P.O. Box 161414, Miami, FL 33116
2 bedroom/2 bath, waterfront home with dock, fully furnished, sleeps 4-6. $370/week.

KEY LARGO LUXURY CONDO — 513/984-0866
Oleinik, 8555 Blue Cut Ln., Cincinnati, OH 45243
Luxuriously decorated, 2 bedroom, dock, pool, sauna, tennis. Minutes from best dive areas.

KEY WEST PRO DIVE SHOP, INC. — 305/296-3823
1605 N. Roosevelt Bl., Key West, FL 33040
Instruction, sales, service, charters, air.
Private instruction and open water checkouts.

KINGSAIL RESORT MOTEL — 305/743-5246
P.O. Box 986, Marathon, FL 33050
Efficiencies, motel rooms, dive shop, reef trips, pool, rental boats, free dockage & ramp. Free coffee.

LADY CYANA DIVERS — 305/664-8717
P.O. Box 1157, Islamorada, FL 33036 MM 85.9
Daily reef trips aboard our 40′ and 60′ custom dive boats.
Rentals, air, sales, service, instruction, group rates, packages.

LOOE KEY REEF RESORT & MARINA — 305/872-2215
P.O. Box 509G, Ramrod Key, FL 33042 MM.27
Singles, doubles, tv, pool, spa, restaurant, ramp, dockage.
Compl. dive shop, instr., USCG cert. custom dive boat, grp. rates.

PENNEKAMP STATE PARK CONCESSION — 305/451-1621
Box 13M, MM 102.5, Key Largo, FL 33037 — 800/432-2871
The only dive shop located directly in Pennekamp.
Free brochure, send 50¢ for reef chart.

PLANTATION KEY LUXURY CONDO — 305/852-5748
c/o Plantation Villas, Box 17, Tavernier, FL 33070
Beautiful 1 BR condo (sleeps 4) on bay. Has everything.
Boat ramp & docks. $295/wk. May-Nov., $350/wk. Dec.-Apr.

QUIESCENCE DIVING SERVICES, INC. — 305/451-2440
P.O. Box N-13, Key Largo, FL 33037 MM. 103.5
Personalized charters in Pennekamp, only 6 divers per boat.
Instruction; Basic, Advanced, Specialty courses.

RENT 20′ FLORIDA KEYS DIVE BOAT — 305/743-0391
and stay aboard 46′ luxuriously furnished, color tv, A/C houseboat at small private island. Dive Pennekamp, Looe Key Alligator Reef, Crystal dive water. $695 week.

RENT 28′ FLORIDA KEYS DIVE BOAT — 305/852-9076
Dive all the Keys hot spots from this fast, comfortable, twin engine dive boat. Sleep aboard 4, galley, shower, A/C, flybridge, dive platform, boarding ladder, $795 wk.

ROCK REEF RESORT — 305/852-2401
P.O. Box 73, Key Largo, FL 33037 MM. 98
Divers Paradise, spacious grounds, beach, jacuzzi, comfortable accommodations and comfortable prices.

SEA CENTER DIVE SHOP — 305/872-2319
P.O. Box 515, Big Pine Key, FL 33043 MM. 29.5
Dive Looe Key, custom boats, dive/lodging packages.
PADI facility, full service shop, 24 hr. hydro.

SEA DWELLERS SPORTS CENTER — 305/451-3640
99850 Overseas Hwy., Key Largo, FL 33037
Dive and snorkel Pennekamp Park.
Special weekday rates.

SEA TRAIL MOTEL — 305/852-8001
Rt. 5, P.O. Box 91, Key Largo, FL 33037, MM 98.5
Cable TV, air conditioned, refrigerator, budget rates, 10% discount. Advanced reservations May through Nov.

SEAFARER RESORT MOTEL — 305/852-5349
P.O. Box 185, Key Largo, FL 33037 MM. 97.8 (Gulfside)
'Fantasy Island' setting, real sandy beach & free paddle boat.
Clean rooms & efficiencies. Please contact us for group rates.!

STEPHEN FRINK PHOTOGRAPHIC — 305/451-3737
P.O. Box 19A, Key Largo, FL 33037 MM 102.5
Complete U/W photo services.
Photo tours and instruction.

STEVE KLEM U/W GUIDE SERVICE — 305/451-1831
P.O. Box 1803, Key Largo, FL 33037 MM. 104
Dive with the legendary "Pied Piper of Pennekamp Park".
Let Steve introduce you to his U/W pets. 6 divers only.

THE BOAT, a div. of Triangle Watersports, Inc. — 305/745-BOAT
Rt. 2, Box 617, Summerland, FL 33042
Free color brochure, customized dives, adventure experiences, instruction, U/W video, Looe Key (FL Keys), Belize(Central America).

THE DIVING SITE, INC. — US 800/634-3935; FL 800/821-9155
12399 Overseas Hwy., Marathon, FL 33050 MM. 53.5
30, 16 & 6 pass. dive boats. Daily reef trips. — 305/289-1021
Charters & group rates; PADI lessons, sales, repairs, dive pkgs.

THE REEF AT MARATHON RESORT CLUB — US-800/327-4836
P.O. Box 871, Marathon, FL 33050 — FL-305/743-7900
2 BR/2 BA villas, efficiencies, motel rooms, tennis, pool, clubhouse & marina. Dive pkgs. & rntl. boats avail.

GEORGIA

DIVERS SUPPLY — 912/474-6790
5208 Mercer Univ. Dr., Macon, GA 31210
PADI training facility, best deal & service.
Located at exit 2 on I-475

DIVING WORLD USA — 404/634-4354
2945 Buford Hwy., Atlanta, GA 30329
All brands, wholesale, retail, repair, rental, trips.
YMCA, NAUI, PADI classes. 3 man chamber.

SANDY SPRINGS DIVERS — 404/252-9372
6445 Roswell Rd., Atlanta, GA 30328
PADI 5 Star training, air, sales, service, trips.
Corrective lens center of the Southeast.

HAWAII

ALOHA DIVE SHOP—KOKO MARINA — 808/395-5922
Honolulu, HI 96825 — 808/395-8882
"Diving is fun" with Jackie and her friends.
Scuba resort cert., tours, boat, sales, rental, all cert.

CAPT. NEMO'S OCEAN EMPORIUM — 808/661-5555
700 Front St. & Dickenson, Lahaina, Maui, HI 96761
1st class diving & sailing, compl. shop: sales, rentals & cameras.
58′ catamaran, 26′ cruisers, small grps., all land activities.

CENTRAL PACIFIC DIVERS — 808/661-8718
780 Front St., Lahaina, Maui, HI 96761
2 & 3 tank trips daily to Hawaii's top spots.
4 & 5 day scuba classes. Request info from Maui's best.

DIVE MAKAI CHARTERS — 808/329-2025
P.O. Box 2955, Kailua-Kona, HI 96745 — Priv. PADI instr.
Diving with a difference, we care! Write to Tom & Lisa.
Rated Kona's best every year since '76 by Undercurrent.

DIVE MAUI INC. — 808/667-2080 or 661-4363
Lahaina Market Pl., Lahaina Luna Rd., Lahaina, HI 96761
Full service NAUI, PADI, SSI store. 3 boats leaving daily for Maui, Lauai, Molokini. Free maps. Photog. avail.

FATHOM FIVE DIVERS — 808/742-6991
P.O. Box 907, Koloa, Kauai, HI 96756
Specializing in small personal charters, daily trips.
NAUI and PADI instruction, air, rentals, photography.

HAWAIIAN WATERCOLORS — 808/879-3584
P.O. Box 616, Kihei, Maui, HI 96753
Experts in dive charters, U/W video, U/W photography.
Contact Ed Robinson for information.

KALIA HOTEL — 808/922-1961
2164 Kalia Rd., Waikiki Beach, Honolulu, HI 96815
Waikiki's most reasonable rates. Std., deluxe and penthouse rooms available, some with cooking facilities.

KONA COAST DIVERS — 808/329-8802
75-5614 Palani Rd., Kailua-Kona, HI 96740
Kona's finest daily charters, priv. PADI/NAUI instr.
Retail, rentals, air & vacation pkg. available. Write today.

LAHAINA DIVER'S INC. — 808/667-7496
710 Front St., Lahaina, Maui, HI 96761
Daily inter-island dive trips to Lanai or Molokini aboard the 43 ft. dive boat, the 'Reliant'.

LEEWARD DIVE CENTER — 808/696-3414
85-979 Farrington Hwy., Waianae, HI 96792
3 boats daily with over 50 different dive sites. Dive the Mahi, 165′ wreck, the plane, turtles & all in small groups.

MAUI DIVE SHOP — 808/879-3388
P.O. Box 1018, Azeka Place, Kihei, HI 96753
Send for free Maui Diver's Guide, enclose $1 postage.
Dive charters to Molokini, rentals, 5 day scuba classes, windsurfing.

MIKE SEVERNS SCUBA DIVING — 808/879-6596
P.O. Box 627, Kihei, Maui, HI 96753
Small groups, 5 cert. divers max. Guided boat dives.
Two person privates w/Tekna DVX3 scooters.

OCEAN ACTIVITIES CENTER — 808/879-4485
3750 Wailea Alanui, D-2, Wailea, HI 96753
Hawaii's only dive lodge: Hotel Lana.
Daily dives to Molokini, La Perousse, Kahoolawe, Lanai.

OCEAN SPORTS ANAEHOOMALU — 808/885-6064
P.O. Box 3291, Waikoloa Beach Resort, Kamuela, HI 96743
Scuba diving charters, instruction, glass bottom boat tours.
Sailing charters, windsurfing, sailing instruction, rentals.

OCEAN SPORTS North Kona Coast
Sheraton Waikaloa Hotel, P.O. Box 3291 WVS, Kamuela, HI
Fantastic diving & sailing, windsurfing lessons & rentals.
42′ catamaran, Zodiac Dives, camera rentals, small groups.

SANDWICH ISLE DIVERS — 808/329-9188
73-1263 Lihau St., Kailua, Kona, HI 96740 — 808/325-7723
Kona-Hawaii's best. Enjoy it with us. Daily trips. Small charters. PADI instruction. Night dives, too. Call or write.

SEA DREAMS HAWAII — 808/329-8744
P.O. Box 4886, Kailua-Kona, HI 96745 — 808/322-6118
Fast, comfortable custom dive boat. 2 to 6 divers. 1 trip daily. 1st class equipment, friendly service. PADI instr.

SEA SAGE DIVE CENTER — 808/822-3841
4-1378 Kuhio Hwy., Kapaa, Kauai, HI 96746
Safely serving Kauai since 1973. NASDS, NAUI, PADI.
Daily boat/shore trips. Complete pro facility.

SOUTH SEAS AQUATICS — 808/538-3854
1050 Ala Moana Bl., Honolulu, HI 96814 — 808/538-3856
Dive the Mahi, 165′ shipwreck and lava tubes! Daily boat charters.
Full service pro dive store since 1961. Write for free brochure.

THE DIVE SHOP OF KIHEI LTD. — 808/879-5172
1975 S. Kihei Rd., Kihei, Maui, HI 96753
Daily dive & sn. to Molokiwi, 3-5 day cert. op. water check-outs
Full svc. facility, Maui Divers Guide 6.95 + P & H.

WAIKIKI DIVING, INC.—WAIKIKI DIVING SCHOOL — 808/922-7188
420 Nahua St., Honolulu, HI 96815 — 808/922-7189
Waikiki's only pro dive shop. PADI & NAUI facility.
Boat dives, sales, rentals, charters. Free brochure.

ILLINOIS

THE GEAR BAG, INC. — 312/637-FINS
1605 N. Newland, Chicago, IL 60635
Located at 6900 west on North Avenue.
NAUI pro facility & PADI training facility.

UNDERSEAS SCUBA CENTER — 312/833-8383
626 N. Addison Rd., Villa Park, IL 60181
Sales, service, rentals, instruction, cameras.
PADI five star training facility.

INDIANA

SCUBA LAKE MICHIGAN CHARTERS — 219/287-2223
Capt. Ernie Piotrowski, 234 N. Albert St., S. Bend, IN 46619
Dive aboard Sea Quest II. Club/shop rates, rentals.
Special Thur. & Fri., 5-tank charters, discount program.

LOUISIANA

SEA HORSE DIVING ACADEMY — 504/246-6523
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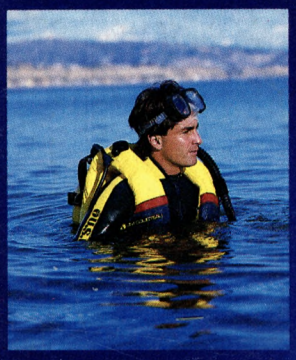
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